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This report describes the activities and measurements carried out by the Environmental Radiation Hazards Division of the Bureau of Radiation and Medical Devices during 1987. It was prepared by R.G. McGregor, with contributions from P.E. Cobbold, R.S. Eaton, B. Hauck, H. Marshall, J.M. Quinn and B.L. Tracy. The radiochemical analyses were carried out by W.G. Awrey, L. Burns, M. Iamello, J. Lahey, A.Y. Lin and W.B. Walker. The work was done under the direction of D.P. Meyerhof, Chief, Environmental Radiation Hazards Division. E.G. Létourneau, Director, Bureau of Radiation and Medical Devices, is thanked for his support of the program.

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Abstract

The radiological surveillance program of the Department of National Health and Welfare is conducted for the purpose of determining levels of environmental radioactivity in Canada and assessing the resulting population exposures. A study was initiated to evaluate the contamination by cesium-137, of caribou, a major source of food in northern communities. Work on development of methods proceeded for the determination of radon, carbon-14, polonium-210, radium-228 and isotopic uranium in samples. Monitoring continued of fallout contamination from Chernobyl of imported foods. All measurements made during 1987 are below the limits recommended by the International Commission on Radiological Protection.

This report is prepared as a summary of work in progress and as a means of publishing the results of ongoing programs in a format that, it is hoped, is useful to those who receive it. Comments, suggestions and questions concerning this material are appreciated. Thanks are hereby extended to those who have taken the time to contact the division and an invitation is extended to everyone to send their ideas to:

Environmental Radiation Hazards Division
Bureau of Radiation and Medical Devices
Department of National Health and Welfare
775 Brookfield Road
Ottawa, Ontario
K1A 1C1

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1. Introduction

The Environmental Radiation Hazards Division of the Bureau of Radiation and Medical Devices (BRMD) investigates the potential health effects to the Canadian population from natural and man-made sources of environmental radioactivity.

During 1986 a study was initiated to evaluate current levels of contamination by cesium-137 in caribou, a major source of food in many northern communities. This study follows up on earlier reports[1,2] which identified cesium-137 as a significant contributor of radiation exposure to northern residents via the lichen-caribou-man foodchain as a result of radioactive fallout from atmospheric weapons tests in the early 1960s. Additional special studies were conducted in the following areas:

- Development of a time-integrating radon dosemeter based on CR-39 plastic.
- Continuation of the case-control study of lung cancer and domestic exposure to radon.
- Sampling and measurement of atmospheric carbon-14.
- Determination of radium-228 in water via liquid scintillation counting of actinium-228.
- Development of methods for determination of polonium-210 in biological samples.
- Determination of isotopic uranium in water by alpha spectroscopy.

Studies on the potential impact of radioactive emissions from nuclear reactors in Canada and residual fallout from atmospheric nuclear weapons tests were maintained.

Levels of radioactivity in samples of food imported into Canada contaminated as a result of fallout from Chernobyl were measured from 30 different countries. A program for export certification for certain radioisotopes in Canadian food was implemented.

In this report, results are presented in tabular form and are expressed in the SI system of units. Radioactivity measurements are in becquerels (Bq), where one becquerel is equivalent to 27 picocuries. Absorbed doses are in grays (Gy), where one gray is equal to 100 rads. Dose equivalents are in sieverts (Sv), where one sievert equals 100 rems.

2. Special Projects

2.1 Radon Studies

The full case-control study of lung cancer and domestic exposure to radon was continued in Winnipeg. Staff of the Manitoba Cancer Treatment and Research Foundation interviewed 200 pairs of cases and controls during the year. To date 350 cases and controls have been interviewed and 1400 radon dosemeter results for six-month exposure periods have been analysed.

Development of a time-integrating dosemeter for radon based on nuclear track counting of alpha-damage tracks in CR-39 (poly allyl diglycol carbonate) plastic continued. Field trials of the radon dosemeter were completed. Calibration using CR-39 prepared with 7% CHPC (cyclohexyl peroxydicarbonate) initiator and 1% DOP (diiso octyl phthalate) plasticizer yielded a sensitivity of 2.0 tracks cm^{-2} per $kBqm^{-3}h$ exposure and a lower limit of detection of 47 $kBqm^{-3}h$. The relative standard deviation is 15% for radon exposures greater than 450 $kBqm^{-3}h$. Results were presented at the American Pollution Control Association Specialty Conference, Indoor Radon II[3].

2.2 Caribou

At the end of 1986, the bureau began a program to measure the current levels of cesium-137 in caribou, a major source of food in many communities in northern Canada. Lichens are the primary source of radionuclides in grazing caribou, since, being slow-growing, non-deciduous, and rootless, the lichens retain radioactivity accumulated from atmospheric fallout. Reindeer pastures in Lapland were contaminated by fallout from the Chernobyl nuclear reactor fire, and there was some concern that the grazing-lands of Canadian caribou might have been similarly affected. Samples of caribou meat were taken from the major herds in the fall of 1986 and spring of 1987. The barren-ground caribou herds of the Northwest Territories carry muscle-tissue burdens of cesium-137 of 10-400 $Bqkg^{-1}$, and similar activities appear in the scattered woodland caribou of Yukon Territory. The large George River herd of woodland caribou, in Quebec and Labrador, was sampled at three locations, and the cesium-137 activities in the meat ranged from 300 $Bqkg^{-1}$ near Ungava Bay to 1100 $Bqkg^{-1}$ in the Caniapiscau River region of central Quebec. More measurements will be made of animals taken from this herd later in 1987 and in the spring of 1988. About 20% of the cesium-137 currently present in Canadian caribou had its origin in the Chernobyl nuclear reactor; the bulk of the current activity was deposited as fallout from atmospheric weapons tests in the early 1960s, and has been retained in the lichens, falling away with an effective half-life in the biosphere of 7-8 years. The current levels of activity present a very low risk to regular consumers of caribou meat, and no recommendation to reduce consumption has been made.

2.3 Measurement of Atmospheric Carbon-14

The measurement of atmospheric carbon-14 levels is of particular interest since carbon-14 is a potential emission product from a nuclear reactor site. A method is presently under development for the collection and measurement of carbon-14 which involves the trapping of atmospheric carbon dioxide on sodium hydroxide and its subsequent evolution and re-trapping in a carbon dioxide trapping agent (Carbo-sorb) which is suitable for liquid scintillation counting using Permafluor-V scintillant.

Preliminary work has shown that the proposed method has great promise. Several studies have still to be carried out, including ascertaining the transfer efficiency of the carbon dioxide from the sodium hydroxide to the trapping agent.

Once the laboratory trials are complete, it is anticipated that an atmospheric carbon-14 sampling station will be placed in the vicinity of a nuclear reactor site to determine whether enhanced levels of carbon-14 can be measured.

2.4 Radium-228

A radiochemical method has been developed to determine Ra-228, in addition to Ra-226, in drinking water. The radium is co-precipitated with lead sulphate, re-dissolved in [[(Carboxymethyl)imino]bis-(ethylenenitrilo)]tetra-acetic Acid, (DTPA), and re-precipitated on barium sulphate. The Ac-228 daughter is extracted into 15% HDEHP (2-di-ethylhexyl phosphoric acid) from the supernatant. The Ra-228 concentration is determined by liquid scintillation counting of this daughter in a toluene-based scintillant. The lower limit of detection for Ra-228 from a one litre sample is 45 $mBqL^{-1}$.

2.5 Isotopic Uranium

A procedure has been prepared for the determination of isotopic uranium by alpha spectroscopy. Water samples are concentrated by evaporation and biological materials are solubilized by suitable chemical means. The uranium is

separated from impurities by ion-exchange techniques and electrodeposited on stainless steel planchets prior to counting in an alpha spectrometer.

2.6 Radiochemical Determination of Polonium-210

Work has continued on a method for the determination of polonium-210 involving spontaneous electrodeposition on silver. Rapid rotation of the silver disc at a speed just below that which causes cavitation, results in higher tracer recoveries for the procedure. The method is currently applied to the determination of polonium-210 levels in human bone samples and in various caribou tissues. Lead-210, a progenitor of polonium-210, can also be determined by this method.

2.7 Emergency Planning

A review of the Federal Government's Response to the Chernobyl, USSR Nuclear Accident of April 26, 1986 was published in March 1987. Twenty-four recommendations were made. The main concern centered on communications, firstly with respect to informing the public and secondly to communications of technical information with cooperating laboratories. Other recommendations were related to the updating and improvements in the operation of the Federal Nuclear Emergency Response Plan. A number of these recommendations have been followed up while others await policy decisions.

A document in draft, entitled "Nuclear Emergency Intervention Levels in Food", is currently being circulated among the provinces as part of the process of establishing a food management system following a major nuclear accident.

2.8 Nuclear Power Sources in Outer Space

Because of expertise available within the bureau resulting from our experience with Cosmos 954 and Canada's continuing leading role at the United Nations Committee on the Peaceful Use of Outer Space on matters related to the use of nuclear power sources, the bureau is consulted annually by the Department of External Affairs. As a result, papers of a semi-technical nature are prepared in the bureau to assist the Department of External Affairs in seeking an international consensus on the use of nuclear power in space. The services of a staff member were also provided as a consultant to the Canadian delegation to the Legal and the Scientific and Technical Subcommittees of the main committee.

No additional principles were established in 1987, although a Canadian working paper was the basis for the discussions at the subcommittee meetings. Comments received on this working paper have been included in a revision that will be the basis for further negotiations in 1988.

3. Environmental Monitoring Programs

The Bureau of Radiation and Medical Devices maintains a network of environmental monitoring stations at airports' weather offices across Canada (Figure 1), largely operated with the cooperation of the Atmospheric Environment Service of Environment Canada, and one station at the bureau proper. This network was established in 1958, and the most recent station was installed at CFB Summerside, Prince Edward Island, in the spring of 1987.

Further environmental radioactivity measurements are made in the vicinity of eight nuclear reactor sites:

- the Whiteshell Nuclear Research Establishment (AECL-WNRE), Pinawa, Manitoba;
- the Bruce Nuclear Power Development, Tiverton, Ontario, with eight 750 MW(e) units in service, (four at Bruce A and four at Bruce B);
- the Pickering Nuclear Generating Station, Pickering, Ontario, with seven 500 MW(e) units in service (three at Pickering A and four at Pickering B), and one undergoing retubing (Pickering A);
- the Darlington Nuclear Generating Station, Newcastle, Ontario, with four 880 MW(e) units under construction;
- the Nuclear Power Demonstration Reactor, Rolphton, Ontario, 25 MW(e) was closed down after 25 years of service;
- the Chalk River Nuclear Laboratories (AECL-CRNL), Chalk River, Ontario;
- the Gentilly Nuclear Site, Gentilly, Quebec, 600 MW(e); and
- the Point Lepreau Nuclear Generating Station, Point Lepreau, New Brunswick, 600 MW(e).

The locations for the monitoring equipment are shown in Figures 2 to 8.

Routine monitoring is also carried out for radioactivity in air particulates near the McMaster University Research Reactor, Hamilton, Ontario and in air particulates and sea water during visits of nuclear vessels to Nova Scotia.

3.1 External Radiation Exposure

Measurements of dose rates of external gamma radiation are carried out quarterly at 28 environmental network stations and at 32 locations around the five nuclear power stations (Bruce, Pickering, Darlington, Gentilly, and Point Lepreau). The measurements are performed quarterly, using CaF2:Mn bulb thermoluminescent dosemeters. The TLDs are attached to the weather housing of the air sampling equipment of the network stations, and to the housings of the atmospheric water vapour collection units around the power stations. Four additional sites were added around Gentilly during the year.

Average quarterly dose rates for 1987, together with the yearly cumulative doses, are presented in Tables 1 and 2. Occasionally, TLDs are lost in transit or through vandalism. No quarterly value is reported in such cases; however, in determining the cumulative value, the average value for the remaining quarters is assumed. The values in Table 1 from the environmental stations give an indication of the range of normal background dose rates across Canada. The values from the reactors' environs in Table 2 fall within the same range. This indicates that these doses are attributable to normal background radiation.

3.2 Air

3.2.1 Tritium in Water Vapour

Atmospheric water vapour is collected monthly, for tritium determination, from the vicinity of the Bruce, Pickering, Darlington, Gentilly, and Point Lepreau generating stations. Air is drawn through molecular sieves to collect the water vapour, which is then recovered in the laboratory for the determination of tritium by liquid scintillation counting. The flow rate of air through the sieves is reduced during the summer, from 0.2 m^3d^{-1} to 0.06 m^3d^{-1}, to prevent the sieves becoming saturated by the higher humidity; consequently, the detection limit for the determination of tritium in air is raised during the summer months. The tritium activity in air around these nuclear reactors is given in Table 3; the values are similar to those found in previous years. The activities near Gentilly and Point Lepreau were very close to background. The observations at the Darlington site represent pre-operational background. Note that sample station number 2 reported in earlier reports[4] was decommissioned in early 1987.

3.2.2 Gross Beta Radioactivity

At each station in the environmental monitoring network, a continuous high-volume air sampler draws air through a glass-fibre filter at the rate of about 900 m^3d^{-1}. The gross beta activity on each filter is measured, to determine the gross beta activity in air-borne particulates. Filters are normally returned to the bureau weekly; in areas of heavy pollution the filters are changed more often, as they become clogged. An additional air sampler is operated near the McMaster University Research Reactor in Hamilton, Ontario. Table 4 summarizes the results of these determinations, giving the monthly and annual average specific activity measured at each station, and the average for the entire country. The values show no clear trends, and are

similar to those measured in previous years; they represent principally background activity from natural sources.

3.3 Precipitation

Precipitation, wet and dry together, is collected in open cylinders with polyethylene liners at all stations of the environmental monitoring network. Samples are returned monthly and composited for analysis quarterly. These total quarterly gross beta activities are given in Table 5. As is true for the airborne activities, these represent principally activity from natural sources.

3.4 Submarine Visits

Nuclear submarines occasionally visit Shearwater, Nova Scotia. During these visits the filters collecting air-borne particulates are changed daily at the Shearwater monitoring station, and gross beta activity is measured in the usual way. Samples of seawater are also taken before, during, and after these visits, and scanned by gamma-ray spectrometry. Nuclear submarines also visit Esquimalt and Nanoose Bay, British Columbia, where water and bottom samples are monitored by the Radiation Protection Service of the Ministry of Health of British Columbia. No activity attributable to these vessels was found in 1987.

3.5 Drinking Water

3.5.1 Fission and Activation Products

Untreated water is collected from the intake sites of waterworks on the Winnipeg River, Lake Huron, Lake Ontario, and the Ottawa and St. Lawrence Rivers (Figures 2 to 8) to monitor the effects of any release of fission products from the Whiteshell Nuclear Research Establishment, Ontario Hydro or Hydro-Québec nuclear power generating stations, or the Chalk River Nuclear Laboratories. Water is collected daily, and analyses for strontium-89, strontium-90, and cesium-137 are made quarterly on composite samples. The concentrations of strontium-90 and cesium-137, given in Tables 6 and 7, remained within normal ranges in 1987; strontium-89 was not detected, implying an activity of less than 1 $mBqL^{-1}$.

Following a routine release of 111 TBq of tritium on April 26, 1987 and a non-routine release of 92 TBq on May 2, 1987, from the Bruce "A" Nuclear Generating Station to Lake Huron, special monitoring was carried out during May and June of the drinking water supplies of the towns of Kincardine and Port Elgin. The results (Figure 9) show a gradual decrease from a maximum of 102 BqL^{-1} at Port Elgin on May 1, 1987 to non-detectable levels by mid-June. All measurements confirmed that the tritium content of the drinking water for the two communities was well below the Target Concentration of 4000 BqL^{-1} for continuous consumption as recommended by the Guidelines for Canadian Drinking Water Quality, 1978[5]. The migration and appearance of the reactor-produced tritium followed the pattern of previously reported releases[6].

3.5.2 Natural Radioactivity

Studies of population exposures to natural radioactivity continued with the radiochemical analyses of drinking water for radium-226, total uranium, and, in some cases, also for lead-210 and Rn-222. All concentrations measured in 1987 were less than the Maximum Acceptable Concentrations of 1000 $mBqL^{-1}$ for radium-226, 20 μgL^{-1} for uranium, and 300 $mBqL^{-1}$ for lead-210, as recommended in the Guidelines for Canadian Drinking Water Quality, 1978[3].

Monthly sampling and analysis of drinking water continued all year from Regina, and for April, May and June from Elliot Lake. Quarterly composite samples were analyzed for the balance of the year from Elliot Lake and for all year from Port Hope.

The results for Ra-226 are presented in Table 9. The concentrations from Regina and Port Hope were at or near the detection Limit of 5 $mBqL^{-1}$. The highest concentrations continued to be observed in water from Elliot Lake. The range is from 12 $mBqL^{-1}$ in the October, November, December composite to 19 $mBqL^{-1}$ in May. The town is located at the centre of uranium mining activities in Ontario.

The results for total uranium are presented in Table 8. The concentrations from Elliot Lake and Port Hope are all less than 1.0 μgL^{-1} while from Regina they range from 0.4 μgL^{-1} in November to 4.9 μgL^{-1} in February.

In cooperation with the Province of Manitoba, the study on natural radioactivity levels in water supplies of communities supplied by ground water sources continued. A total of 130 communities is included in the program. Determination of Ra-226, Pb-210 and total uranium was done on an additional 24 samples. Analyses for Ra-228 continues.

Water samples from Wollaston Lake, Saskatchewan and from Silver Springs, Ottawa, Ontario, were analysed for Ra-226, total uranium and Pb-210 and in the case of the Ottawa sample, for Rn-222 also.

3.6 Milk

Samples of whole milk are collected monthly from commercial outlets in 18 cities (Figure 1); cesium-137 is determined monthly, and strontium-90 is determined quarterly, in composite samples. The results of these analyses, for 1987, are given in Tables 10 and 11. The levels of cesium-137 in milk have been dropping since the cessation of atmospheric weapons testing in 1963 (see Figure 10), but were elevated slightly after the Chernobyl nuclear reactor fire in the spring of 1986. By the end of 1987, levels had again fallen to, or below, values found before the accident in most parts of the country, the notable exceptions being Vancouver, British Columbia, and Sussex, New Brunswick. The levels of strontium-90 in milk were barely affected by the Chernobyl fallout, and in 1987 resembled those measured in 1985[7].

Monthly samples of raw milk from farms are also taken in the vicinity of the Whiteshell Nuclear Research Establishment and the Bruce Nuclear Power Development, and analysed for iodine-131 and cesium-137. Cesium-137 activities were of the same order as the levels elsewhere in the country, indicating that global fallout is the major source of cesium-137 in milk at these locations. No iodine-131 was detected.

3.7 Quality Assurance

Laboratory quality control programs for analyses continued through participation in interlaboratory comparisons sponsored by the United States Environmental Protection Agency and the U.S. Department of Energy. The performance of the division is summarized in Table 12.

Participation in the Environmental Protection Agency's interlaboratory comparison studies revealed two inconsistencies in the calibrations of the gamma-ray spectrometers. In one case, the fault lay in the manufacturer's certification of the calibration standard. In the other, the difficulty lies in the true-coincidence summing of cascading gamma rays from certain radionuclides[8].

4. Chernobyl Follow-up

4.1 Food Monitoring

4.1.1 Imports

As part of our examination of the levels of radioactivity in food imported into Canada which may have been contaminated as a result of fallout from Chernobyl, 390 samples were measured from 30 different countries. As the year progressed, the number of food samples was reduced as certain types showed very low residual contamination. However, dried spices and hazel nuts originating in Greece and Turkey remained a problem and monitoring of these items continued. Thirty-seven samples of oregano were measured; five were refused entry into Canada when their content of radioactive cesium was found to exceed the screening limits. All the hazel nut samples were cleared. The results of analyses of imported foods for 1987 are given in Table 13.

4.1.2 Export Certification

A number of countries including Egypt, Greece, Japan, Morocco, Peru, Thailand and Venezuela require radiation certificates for certain radioisotopes in Canadian food sold for export. Analysis for radioisotope content of the Canadian food product for export (with the exception of milk and milk products) is the responsibility of the exporting firm and is performed under contract to the firm by commercial analytical laboratories. A copy of the analysis, together with product identification, quantity, shipment date and other information required by the purchasing country, is supplied to the Bureau of Radiation and Medical Devices where, upon review, a radiation certificate is issued to the exporting firm.

About 50 certificates were issued during 1987 for foods and other items including apples, various kinds of beans, honey, butter, powdered skim milk, tobacco, and bulls' semen. None of these exceeded the limits set by the importing country.

4.2 Amendments to 1986 Data

Please note that gross beta radioactivity levels in precipitation previously reported[4] for the second quarter of 1986 are in error. The corrected values are shown in Table 14. This table replaces Table 11, page 55 of the 1986 report.

A second error is noted in Table 15, page 69[4] of the 1986 Report where the gross beta radioactivity deposition for Quebec for the month of June, 1986 should read 160 Bqm^{-2} (in place of 16 Bqm^{-2}).

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Figure 1. Canadian Sampling Station Network

KEY TO FIGURE 1

Sampling Station	Drinking	Air	Precipitation	Milk	TLD
Calgary	-	x	x	x	x
Churchill	-	x	x	-	x
Coral Harbour	-	x	x	-	x
Digby	-	x	x	-	x
Edmonton	-	x	x	x	x
Elliot Lake	x	-	-	-	-
Fredericton	-	x	x	-	x
Goose Bay	-	x	x	-	x
Greenwood	-	x	x	-	x
Halifax	-	x	x	x	x
Hay River	-	x	x	-	x
Inuvik	-	x	x	-	x
McMaster	-	x	-	-	-
Moncton	-	-	-	x	-
Montreal	-	x	x	x	x
Moosonee	-	x	x	-	x
Ottawa	-	x	x	x	x
Port Hope	x	-	-	-	-
Quebec	-	x	x	x	x
Regina	x	x	x	x	x
Resolute	-	x	x	-	x
Saskatoon	-	x	x	x	x
Sault Ste. Marie	-	x	x	x	x
St. John's	-	x	x	x	x
Summerside	-	x	x	-	x
Sussex	-	-	-	x	-
Thunder Bay	-	x	x	x	x
Toronto	-	x	x	x	x
Truro	-	-	-	x	-
Vancouver	-	x	x	x	x
Whitehorse	-	x	x	-	x
Windsor	-	x	x	x	x
Winnipeg	-	x	x	x	x
Yellowknife	-	x	x	-	x

"x" indicates that a given type of sampling is carried out at a given station.

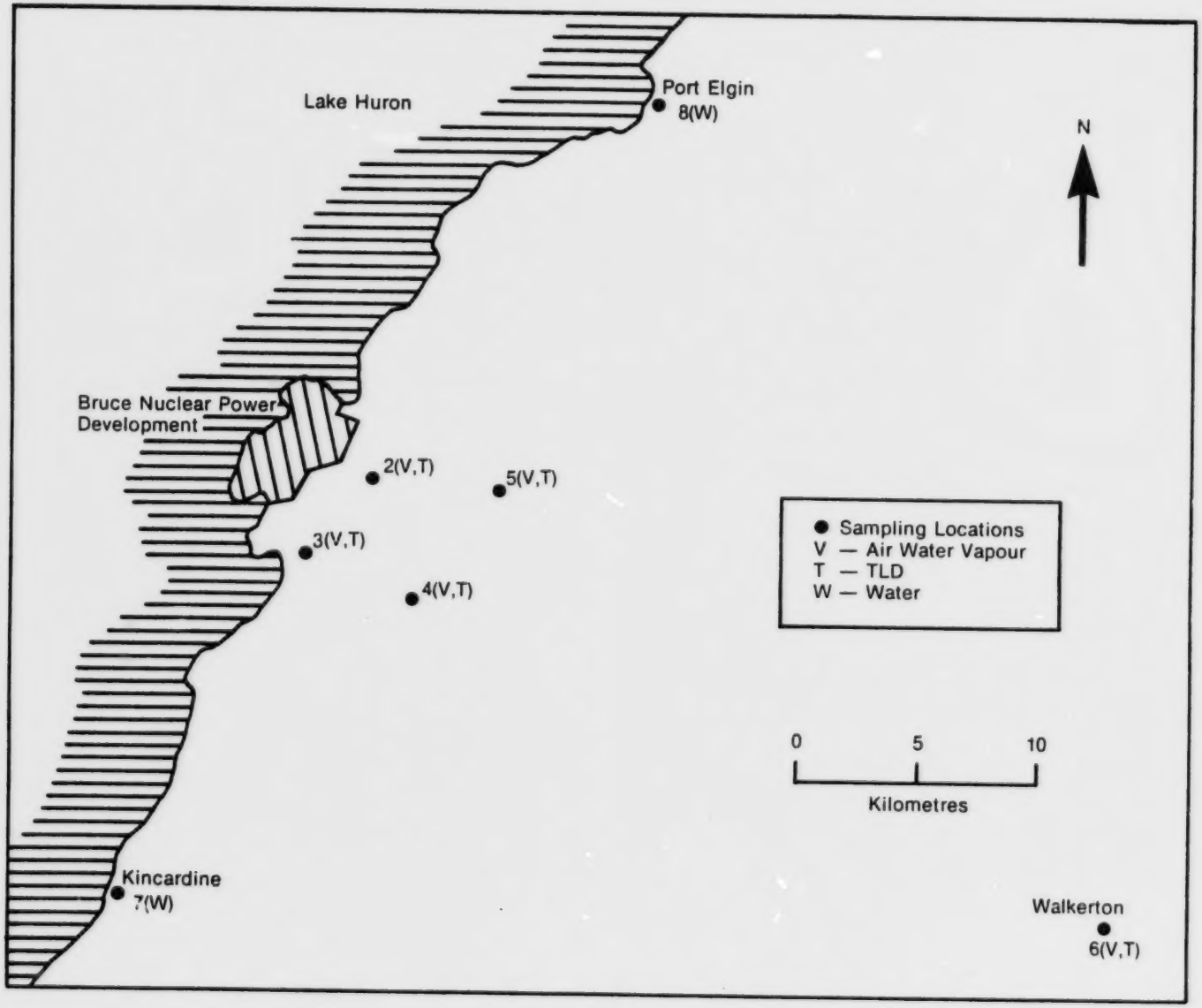

Figure 2. Sampling Locations in the Vicinity of the Bruce Nuclear Power Development

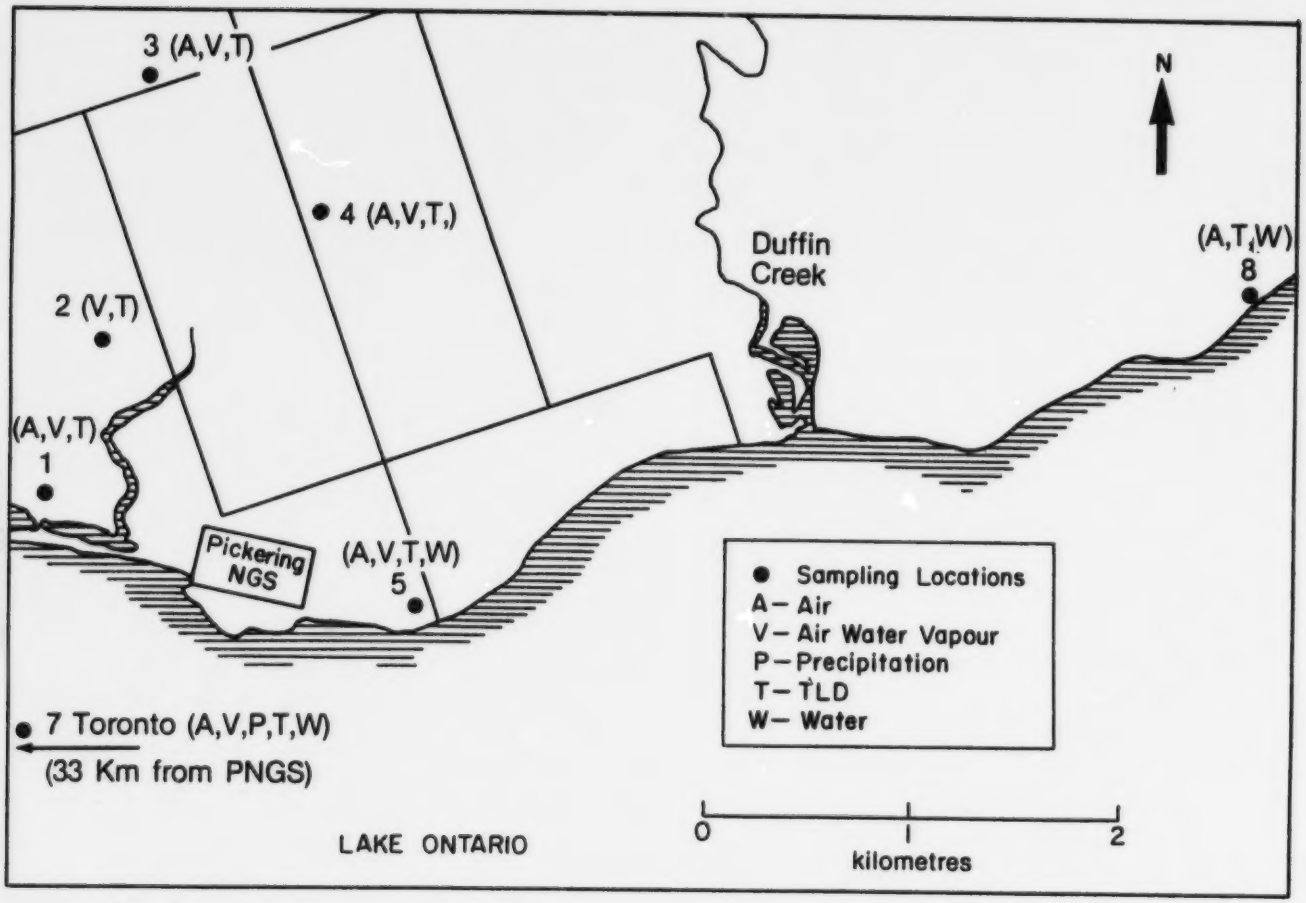

Figure 3. Sampling Locations in the Vicinity of the Pickering Nuclear Generating Station

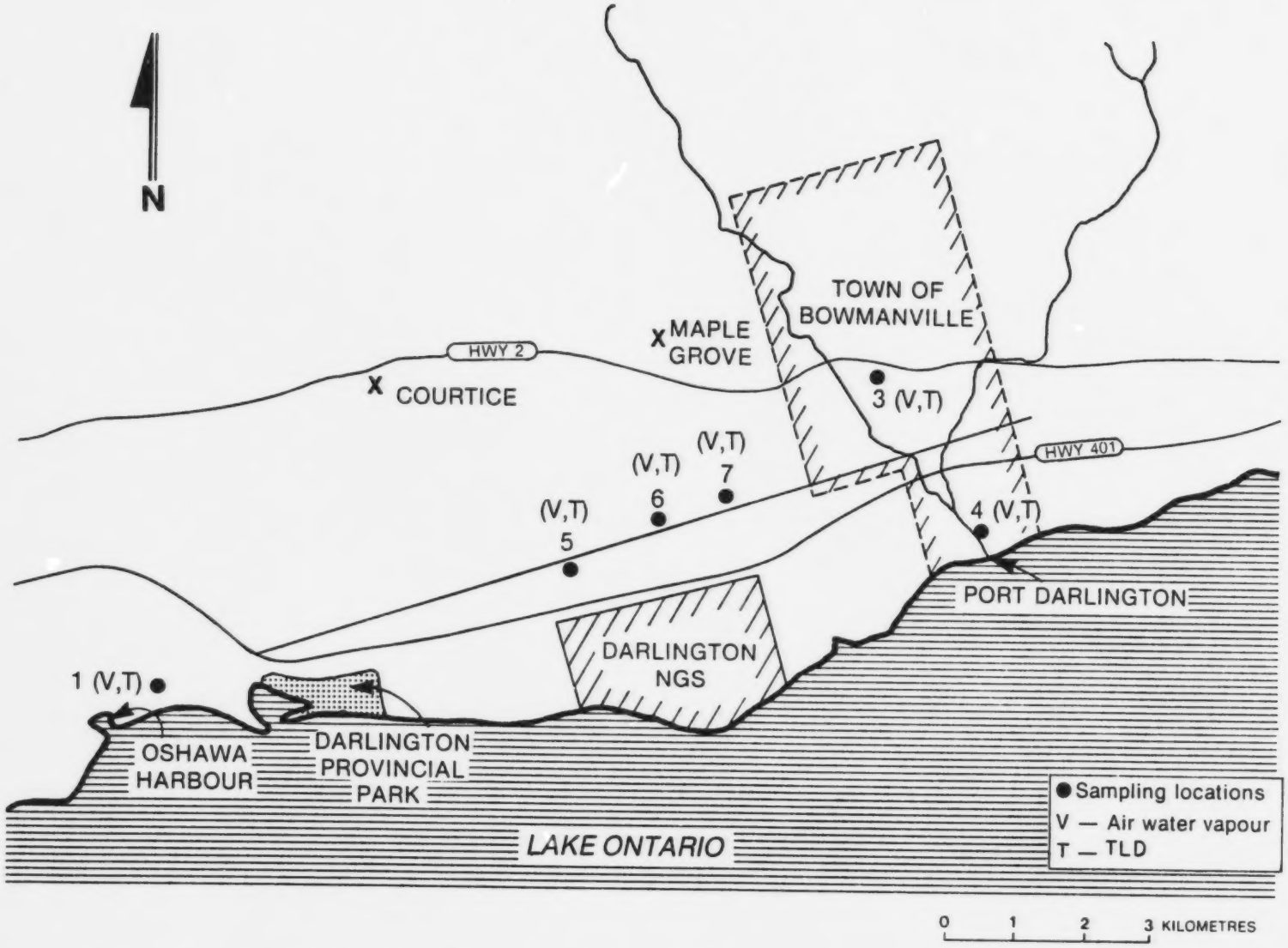

Figure 4. Sampling Locations in the Vicinity of the Darlington Nuclear Generating Station

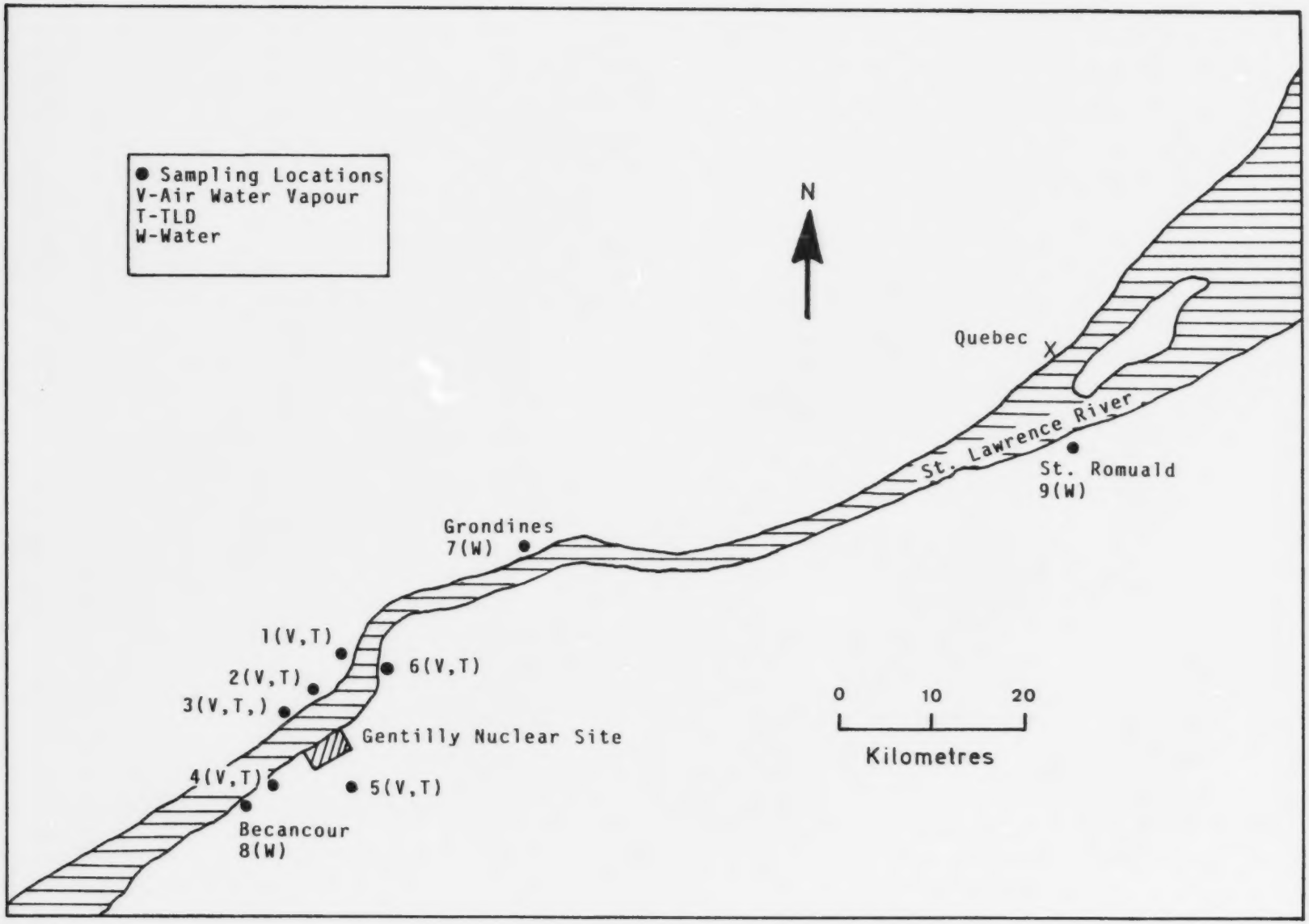

Figure 5. Sampling Locations in the Vicinity of the Gentilly Nuclear Site

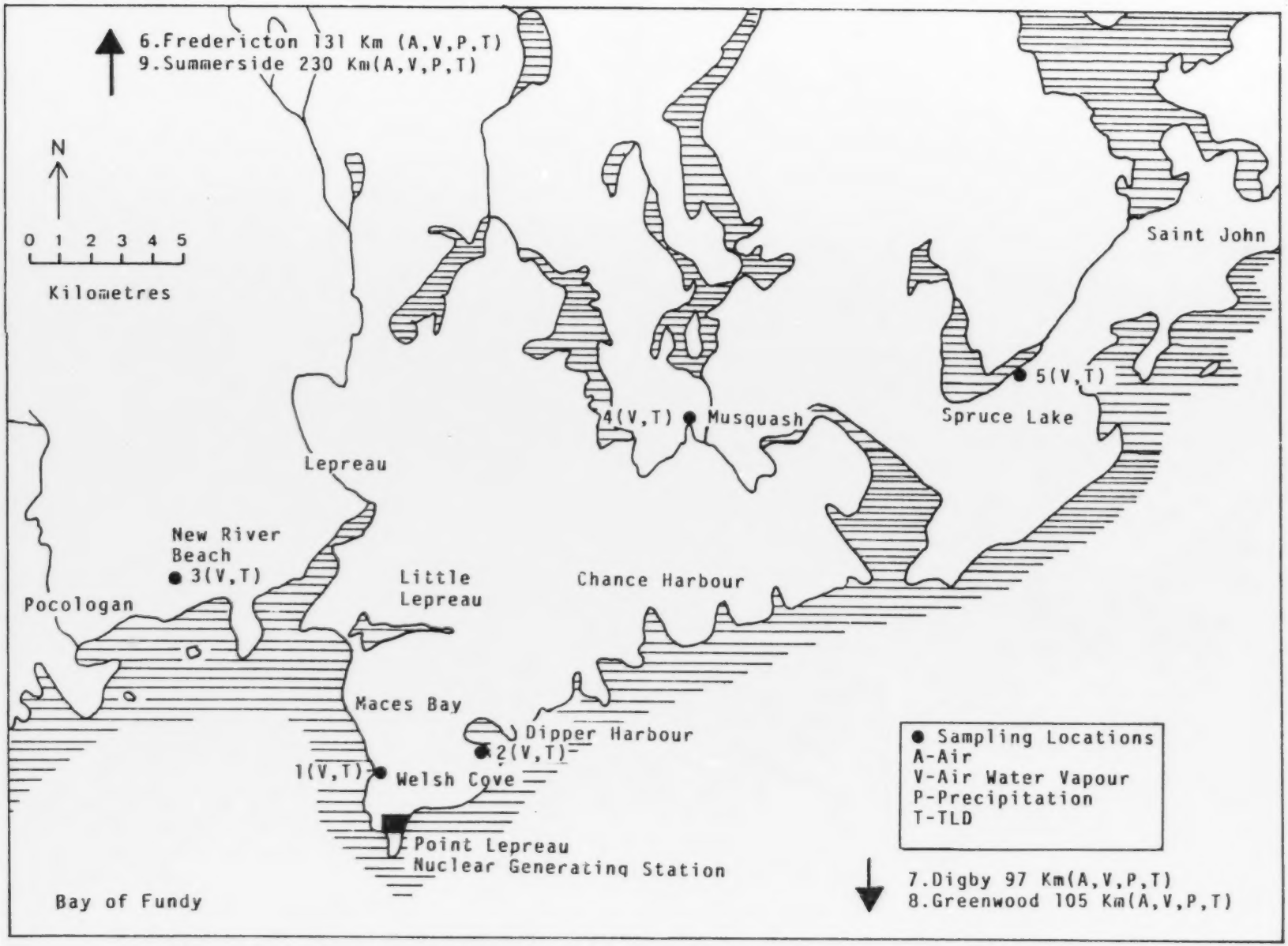

Figure 6. Sampling Locations in the Vicinity of the Point Lepreau Nuclear Generating Station

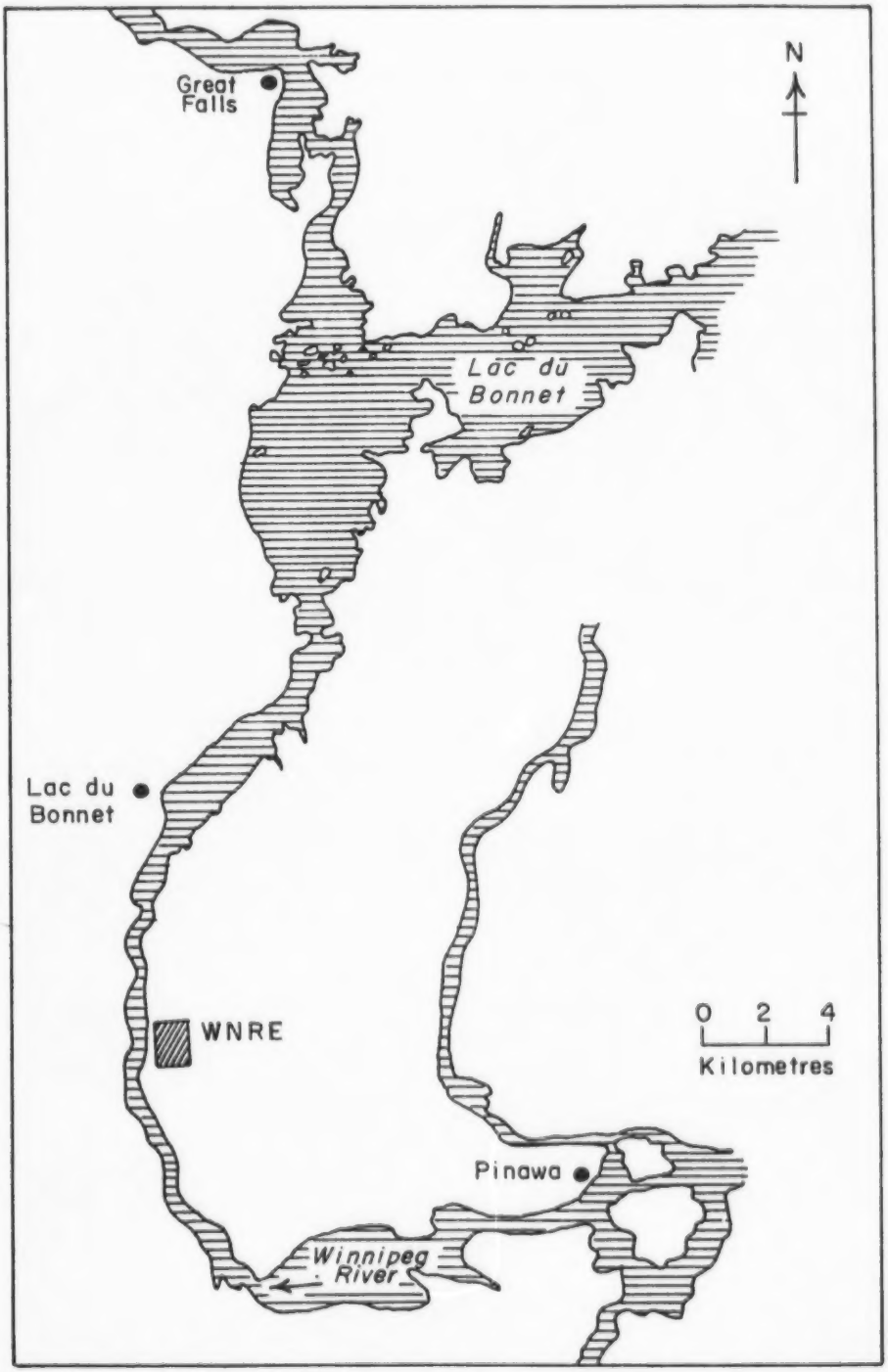

Figure 7. Sampling Locations on the Winnipeg River - Drinking Water

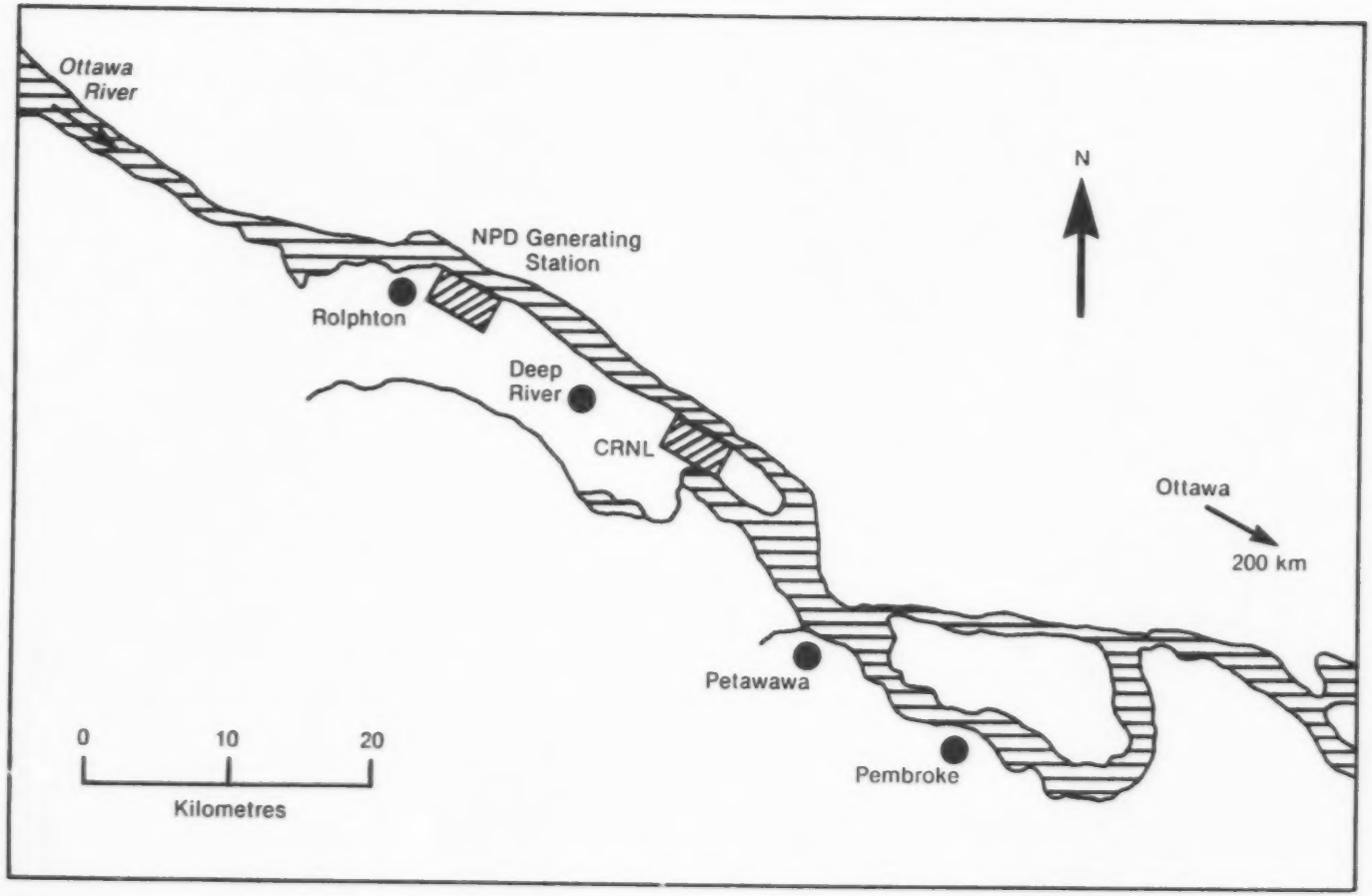

Figure 8. Sampling Locations on the Ottawa River - Drinking Water

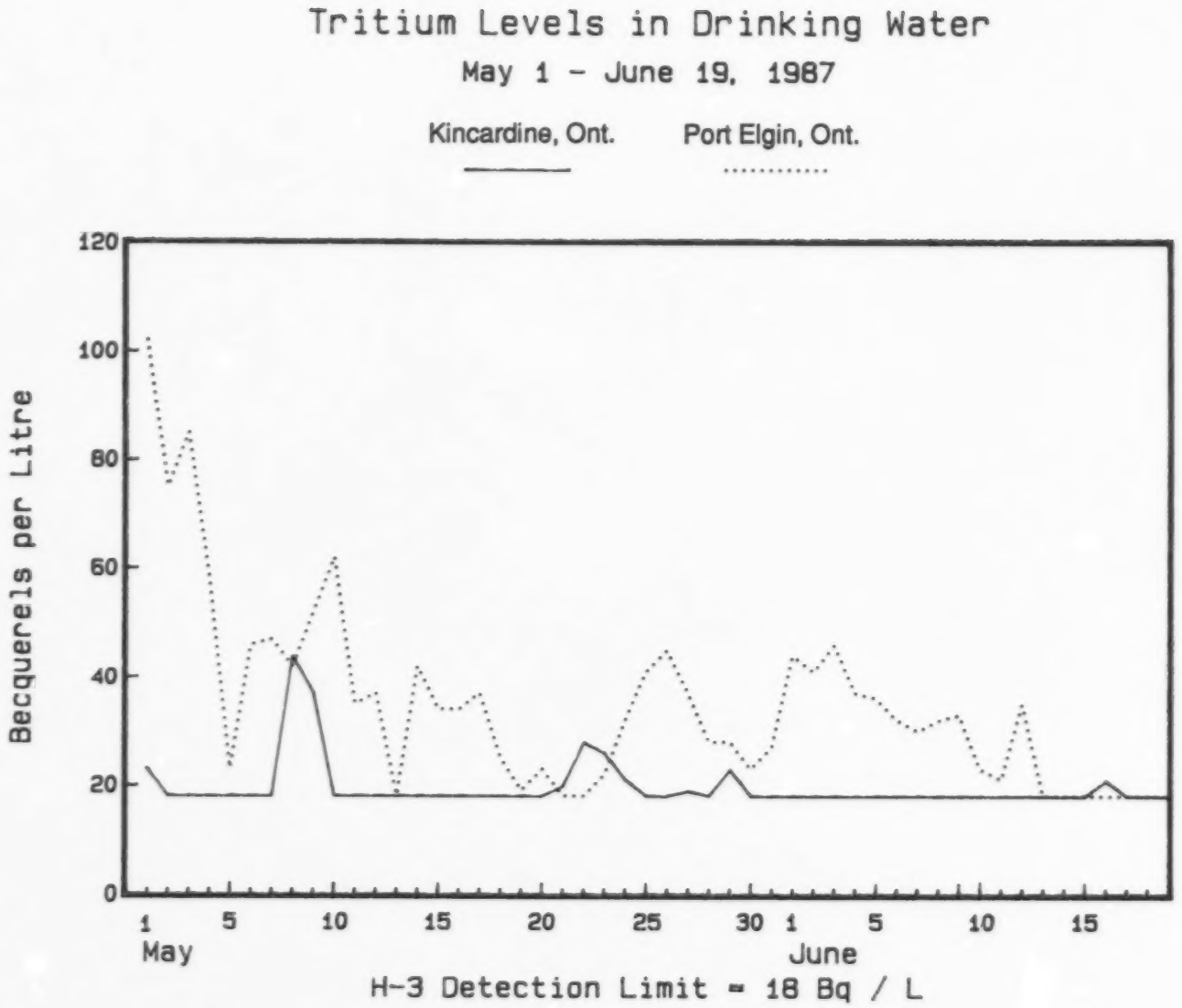

Figure 9. Tritium Levels in Drinking Water for Kincardine and Port Elgin following releases from the Bruce Nuclear Generating Station

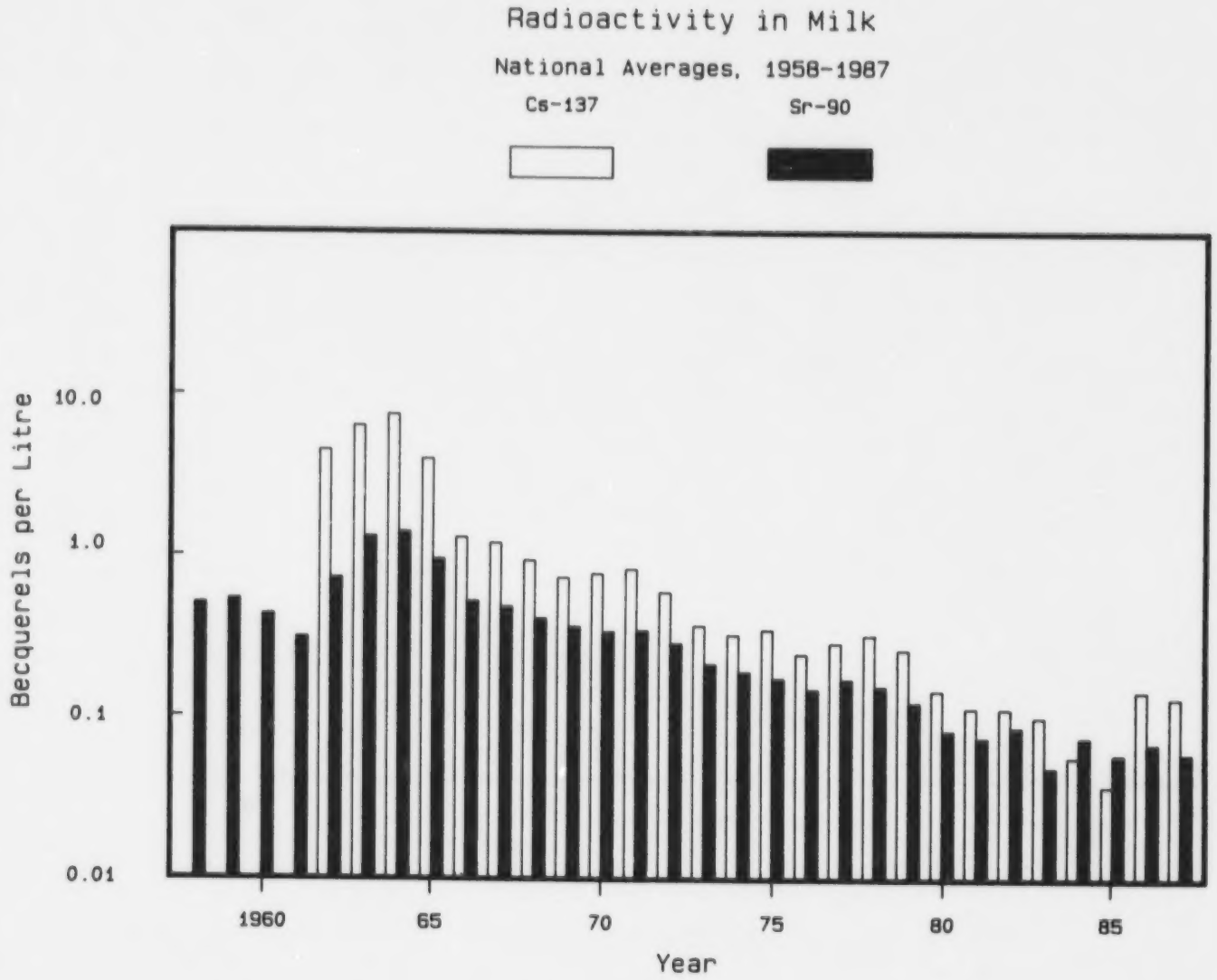

Figure 10. Fallout Trends in Milk, 1958-1987

Table 1. External Radiation Dose Measurements
At Environmental Stations for 1987

Station	Dose Rate (μGy h^{-1})				Cumulative Dose (mGy)
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	
Calgary	0.06±0.02	0.06±0.01	0.11±0.03	0.09±0.02	0.70±0.09
Churchill	0.06±0.02	0.05±0.02	0.10±0.02	0.08±0.02	0.64±0.09
Coral Harbour	0.07±0.02	0.07±0.02	0.08±0.02	0.06±0.02	0.61±0.09
Digby	0.08±0.02	0.10±0.02	0.11±0.02	0.14±0.03	0.94±0.10
Edmonton	0.08±0.02	0.10±0.02	0.11±0.02	0.11±0.03	0.88±0.10
Fredericton	0.08±0.02	0.08±0.02	0.12±0.02	0.11±0.03	0.85±0.10
Goose Bay	0.08±0.02	0.08±0.02	0.13±0.03	0.08±0.03	0.81±0.11
Greenwood	0.06±0.02	0.08±0.02	0.09±0.02	0.13±0.03	0.79±0.10
Halifax	0.06±0.02	0.11±0.03	0.09±0.02	0.11±0.03	0.81±0.11
Hay River	0.09±0.02	0.09±0.02	0.10±0.01	0.10±0.02	0.83±0.08
Inuvik	0.05±0.02	0.09±0.02	0.10±0.01	0.10±0.02	0.74±0.08
Montreal	0.07±0.02	0.06±0.02	0.11±0.01	0.10±0.03	0.74±0.09
Moosonee	0.06±0.02	0.10±0.02	0.09±0.01	0.14±0.03	0.85±0.09
Ottawa	0.07±0.02	0.05±0.02	0.11±0.02	0.08±0.02	0.68±0.09
Quebec City	0.10±0.02	0.08±0.02	0.10±0.02	0.09±0.02	0.81±0.09
Regina	0.07±0.02	0.06±0.02	0.13±0.02	0.11±0.03	0.81±0.10
Resolute	0.06±0.02	0.04±0.02	0.07±0.02	0.07±0.02	0.53±0.09
Saskatoon	0.07±0.02	0.09±0.02	0.15±0.02	0.12±0.03	0.94±0.10
Sault Ste. Marie	0.06±0.02	0.08±0.02	0.09±0.02	0.08±0.03	0.68±0.10
St. John's	0.09±0.02	0.09±0.02	0.13±0.02	0.12±0.03	0.94±0.10
Summerside	-	-	0.09±0.02	0.11±0.02	0.94±0.12
Thunder Bay	0.08±0.02	0.08±0.02	0.10±0.02	0.11±0.03	0.81±0.10
Toronto	0.07±0.02	0.05±0.02	0.09±0.02	0.08±0.02	0.64±0.09
Vancouver	0.08±0.02	0.07±0.02	0.12±0.02	0.08±0.03	0.77±0.10
Whitehorse	0.09±0.02	0.12±0.03	0.15±0.03	0.15±0.03	1.12±0.12
Windsor	0.08±0.02	0.07±0.02	0.11±0.02	0.09±0.03	0.77±0.10
Winnipeg	0.07±0.02	0.08±0.02	0.11±0.02	0.11±0.03	0.81±0.10
Yellowknife	0.09±0.02	0.13±0.03	0.15±0.02	0.07±0.02	0.96±0.10

- No sample

Table 2. External Radiation Dose Measurements in the Vicinity of Nuclear Reactors for 1987

Station	Dose Rate (μGy h^{-1})				Cumulative Dose (mGy)
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	
Bruce					
2 - 3.5 km ESE	0.07±0.02	0.10±0.01	0.10±0.02	0.09±0.01	0.79±0.07
3 - 4.0 km S	0.06±0.02	0.08±0.01	0.10±0.02	0.08±0.03	0.70±0.09
4 - 8.0 km SE	0.07±0.02	0.05±0.02	0.08±0.02	0.09±0.02	0.64±0.09
5 - 8.0 km ESE	0.08±0.02	0.07±0.02	0.12±0.02	0.11±0.03	0.83±0.10
6 - 40 km SE	0.08±0.03	0.10±0.02	0.13±0.02	0.12±0.02	0.94±0.10
Pickering					
1 - 1.0 km WNW	0.08±0.02	0.06±0.02	0.10±0.02	0.09±0.02	0.72±0.09
2 - 1.5 km NW	0.08±0.02	0.06±0.02	0.11±0.02	0.05±0.02	0.66±0.09
3 - 2.0 km NNW	0.07±0.02	0.05±0.02	0.11±0.02	0.09±0.03	0.70±0.10
4 - 1.5 km NE	0.09±0.02	0.07±0.02	0.09±0.02	0.10±0.03	0.77±0.10
5 - 1.0 km E	0.06±0.02	0.07±0.02	0.10±0.02	0.08±0.01	0.68±0.08
7 - 33.0 km SW	0.07±0.02	0.05±0.02	0.09±0.02	0.08±0.02	0.64±0.09
8 - 5.0 km ENE	0.07±0.02	0.04±0.02	0.09±0.02	0.07±0.02	0.59±0.08
Darlington					
1 - 8.0 km W	0.07±0.02	0.10±0.03	0.11±0.02	0.08±0.03	0.79±0.11
3 - 5.8 km NE	0.07±0.02	0.05±0.02	0.09±0.02	0.10±0.03	0.68±0.10
4 - 5.3 km ENE	0.07±0.02	0.06±0.02	0.10±0.02	0.09±0.03	0.70±0.10
5 - 2.4 km NNW	0.07±0.02	0.05±0.02	0.07±0.02	0.08±0.03	0.59±0.10
6 - 2.0 km N	0.07±0.02	0.07±0.02	0.11±0.02	0.09±0.03	0.74±0.10
7 - 2.6 km NNE	0.09±0.02	0.12±0.03	0.16±0.02	0.13±0.02	1.10±0.10
Gentilly					
1 - 11.5 km NNE	0.07±0.03	0.07±0.02	0.10±0.02	0.09±0.03	0.72±0.11
2 - 6.5 km NNE	-	-	0.10±0.02	0.09±0.03	0.83±0.12
3 - 5.0 km NNW	-	-	0.10±0.02	0.08±0.02	0.78±0.09
4 - 7.0 km SW	0.06±0.02	0.05±0.01	0.09±0.02	0.07±0.02	0.59±0.08
5 - 6.5 km ENE	-	-	0.11±0.02	0.09±0.03	0.88±0.12
6 - 13.5 km NE	-	-	0.10±0.02	0.08±0.02	0.79±0.09
Point Lepreau					
1 - 2.6 km NNW	0.08±0.02	0.06±0.01	0.11±0.02	0.08±0.02	0.72±0.08
2 - 4.8 km NNE	0.06±0.03	0.08±0.02	0.11±0.02	0.11±0.03	0.79±0.11
3 - 9.7 km NW	0.07±0.03	0.07±0.02	0.07±0.01	0.08±0.02	0.64±0.09
4 - 19.3 km NNE	0.07±0.02	0.08±0.02	0.08±0.01	0.09±0.02	0.70±0.08
5 - 29.0 km NE	0.11±0.02	0.12±0.02	0.12±0.02	0.15±0.03	1.10±0.10
6 - 131 km N	0.08±0.02	0.08±0.02	0.12±0.02	0.11±0.03	0.85±0.10
7 - 97 km SE	0.08±0.02	0.10±0.02	0.11±0.02	0.14±0.03	0.94±0.10
8 - 105 km ESE	0.06±0.02	0.08±0.02	0.09±0.02	0.13±0.03	0.79±0.10

- No sample

Table 3. Tritium Activity in Atmospheric Water Vapour for 1987

(Becquerels per cubic metre air)

Station	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
Bruce													
2 - 3.5 km ESE	4.80	2.08	5.00	1.37	1.63	3.06	3.28	4.90	.57	3.57	1.59	.88	2.73
3 - 4.0 km S	.87	3.17	14.50	3.37	2.60	1.85	2.11	.93	.65	1.77	3.29	2.32	3.12
4 - 8.0 km SE	1.36	1.27	5.07	2.94	3.68	2.45	.42	.45	.48	.88	.64	1.37	1.75
5 - 8.0 km ESE	1.57	1.06	1.82	1.25	.62	2.15	*	.94	.70	1.22	.53	.73	1.05
6 - 40.0 km SE	.13	.53	.23	.32	*	.14	.85	.26	.11	.17	.36	.09	.27
Pickering													
1 - 1.0 km WNW	5.12	2.71	.69	4.54	1.91	3.15	4.80	1.04	8.86	4.43	3.03	8.10	4.03
2 - 1.5 km NW	3.04	4.71	3.59	4.87	4.15	3.06	1.31	1.01	2.48	4.48	2.28	6.98	3.50
3 - 2.0 km NNW	1.40	2.99	3.08	8.39	5.55	4.37	4.44	.83	6.50	4.69	2.62	1.93	3.90
4 - 1.8 km NNE	4.90	4.03	8.86	6.91	11.90	8.08	6.88	2.55	6.16	13.30	7.89	8.34	7.48
5 - 1.0 km E	32.30	11.40	24.80	10.40	5.43	30.10	21.70	22.40	16.80	28.10	11.90	15.30	19.22
7 - 33.0 km SW	.22	.41	.36	.45	*	*	.48	.27	.23	.37	.13	+	.28
Darlington													
1 - 8.0 km W	1.12	.64	.47	.35	.19	.33	.87	.25	.20	1.02	.89	1.02	.61
3 - 5.8 km NE	.71	.62	.13	.18	.39	.15	.15	.39	.14	.53	.42	.65	.37
4 - 5.3 km ENE	.93	.51	.09	.31	.10	.18	.43	.17	.21	.45	.34	.67	.37
5 - 2.4 km NNW	.24	.20	.19	.29	.12	.18	.15	.29	.25	.88	.67	.65	.34
6 - 2.0 km N	.39	.23	.15	.32	.22	.32	.14	.20	.12	.76	.52	.35	.31
7 - 2.6 km NNE	.68	.23	.25	.14	.20	.24	.35	*	.21	.68	.58	.19	.32
Gentilly													
1 - 11.5 km NNE	.80	.76	.48	.21	.12	.26	.23	.24	.14	.80	.07	.31	.37
2 - 6.5 km NNE	.22	.24	.10	.17	.22	.17	.21	.43	.25	1.13	.33	.11	.30
3 - 5.0 km NNW	.40	.10	.11	.22	.25	*	.10	*	.16	.25	.11	.18	.17
4 - 7.0 km SW	.38	.05	.27	1.25	*	*	.30	.22	*	.09	.32	.29	.30
5 - 6.5 km ENE	.66	.42	1.41	.32	.39	*	.20	*	.15	.47	.36	.27	.39
6 - 13.5 km NE	.48	.25	.08	.13	.10	*	.20	.35	*	.43	.31	.08	.21

Table 3. (cont'd)

(Becquerels per cubic metre air)

Station	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
Pt. Lepreau													
1 - 2.6 km NNW	.37	.29	.56	.34	.63	*	.57	.28	*	.48	.17	.07	.32
2 - 4.8 km NNE	.14	.17	.57	.84	.97	.45	1.22	1.15	.17	.13	.07	+	.49
3 - 9.7 km NW	.09	.13	.31	.19	.18	.12	.17	.22	*	+	+	.05	.15
4 - 19.3 km NNE	+	.12	.06	.07	*	*	.11	.32	*	+	+	+	.10
5 - 29 km NE	.05	.24	+	.23	*	*	*	.29	*	+	+	+	.11
6 - 131 km N	.11	+	+	.05	*	*	.18	.13	*	.05	+	+	.06
7 - 97 km SE	.07	.09	+	.07	*	*	.20	.20	*	+	+	-	.09
8 - 105 km ESE	.28	.18	.07	.06	*	*	.11	.15	*	+	+	+	.14
9 - 230 km NE	-	-	-	-	-	-	.14	*	*	+	+	+	.09

* Less than 0.1 Bq m^{-3} May-Sept.
\+ Less than 0.04 Bq m^{-3} Jan-Apr. and Oct.-Dec.
\- No sample

Table 4. Gross Beta Activity in the Canadian Air Monitoring Network for 1987
(Millibecquerels per cubic metre)

Sampling Station	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
Calgary	.15	.42	.56	.36	.34	.40	.44	.31	.22	.33	.23	.27	.34
Churchill	.62	.54	.67	.35	.18	.09	.08	.14	.21	.21	.41	.52	.33
Coral Harbour	.79	.60	.88	.40	.23	.10	.07	.04	.12	.12	.45	.27	.34
Digby	.39	.53	.47	.25	.27	.26	.42	.25	.23	.36	.34	.00	.31
Edmonton	.42	.78	.80	.30	.32	.35	.36	.32	.28	.33	.68	.39	.44
Fredericton	.37	.29	.24	.11	.22	.26	.28	.37	.34	.41	.33	.26	.29
Goose Bay	.20	.07	.03	.26	.05	.02	.13	.12	.12	.17	.13	.23	.13
Greenwood	.42	.40	.36	.26	.32	.23	.20	.35	.25	.40	.31	.23	.31
Halifax	.44	.40	.33	.26	.36	.36	.33	.30	.24	.38	.29	.29	.33
Hay River	.69	1.11	.92	.41	.39	.22	.25	.31	.26	.30	.81	.72	.53
Inuvik	.72	1.09	1.02	.72	.36	.15	.17	.47	.14	.24	.78	1.13	.58
McMaster	.88	.62	.61	.55	.67	.60	.64	.62	.60	.61	.81	.42	.64
Montreal	.48	.47	.32	.31	.33	.38	.27	.33	.37	.40	.37	.42	.37
Moosonee	.27	.20	.40	.35	.33	.21	.23	.23	.27	.27	.29	.45	.29
Ottawa - Airport	.42	.35	.35	.31	.30	.32	.37	.31	.33	.42	.34	.37	.35
Ottawa - BRMD**	.28	.37	.62	.30	.31	.37	.38	.38	.34	.55	.33	.23	.37
Quebec	.38	.37	.35	.23	.28	.27	.27	.27	.27	.33	.35	.25	.30
Regina	.36	.49	.36	.17	.20	.18	.20	.24	.24	.27	.56	.44	.31
Resolute	.59	.76	.83	.46	.14	.06	.05	.06	.08	.18	.63	.60	.37
Saskatoon	.52	.65	.46	.22	.16	.34	.26	.27	.18	.33	.88	.85	.43
Sault Ste. Marie	.51	.42	.43	.25	.28	.29	.35	.31	.39	.35	.35	.51	.37
St. John's	.19	.17	.28	.19	.22	.11	.15	.14	.23	.24	.24	.11	.19
Summerside	-	-	-	-	-	-	.26	.29	.23	.35	.27	.18	.13
Thunder Bay	.91	.67	.59	.33	.35	.38	.33	.33	.53	.48	.71	.63	.52
Toronto	.64	.40	.44	.30	.36	.39	.30	.22	.97	.37	.30	.24	.41
Vancouver	.16	.29	.28	.22	.22	.20	.16	.19	.21	.24	.14	.05	.20
Whitehorse	.28.	.33	.50	.12	.12	.10	.18	.24	.05	.14	.19	.29	.21
Windsor	.52	.40	.43	.31	.30	.37	.45	.38	.43	.36	.67	.50	.43
Winnipeg	.70	.69	.64	.29	.24	.28	.36	.29	.25	.42	.80	.77	.48
Yellowknife	.61	.60	.51	.15	.11	.07	.06	.02	.09	.24	.81	.98	.35
National Average+	.48	.54	.58	.31	.21	.17	.18	.19	.18	.24	.46	.46	.36

\+ Geographical-Area Weighted

\- No Sample

** BRMD - Bureau of Radiation and Medical Devices

Table 5. Gross Beta Activity in the
Canadian Precipitation Monitoring Network for 1987
(Combined Wet and Dry Deposition)

(Becquerels per square metre)

Station	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total Annual Deposition	Annual Rainfall mm Water
Calgary	28	46	54	29	156	352
Churchill	22	30	49	29	130	423
Coral Harbour	32	27	42	31	133	273
Digby	23	40	42	34	139	1070
Edmonton	29	41	107	20	197	450
Fredericton	34	50	49	38	171	960
Goose Bay	31	45	55	33	163	788
Greenwood	47	41	50	35	172	1074
Halifax	31	44	36	31	141	1237
Hay River	25	32	56	38	151	338
Inuvik	25	11	76	23	136	255
Montreal	30	97	77	25	229	1012
Moosonee	26	0	59	30	153	562
Ottawa - Airport	15	56	54	29	154	911
Ottawa - BRMD**	13	61	55	84	213	911
Quebec	18	160	122	51	350	1091
Regina	20	50	55	26	151	362
Resolute	9	14	33	15	71	143
Saskatoon	29	35	25	21	110	234
Sault Ste. Marie	32	80	79	63	253	979
St. John's	26	44	64	41	175	1364
Summerside	0	0	39	37	152	616
Thunder Bay	28	51	163	27	268	556
Toronto	33	74	69	49	225	710
Vancouver	29	32	40	34	134	958
Whitehorse	16	14	46	15	91	210
Windsor	32	65	78	60	235	1118
Winnipeg	36	32	92	41	200	458
Yellowknife	23	53	44	48	167	295
National Average +	23	34	55	29	139	

+ Geographical Area-Weighted

** BRMD = Bureau of Radiation and Medical Devices

Table 6. Strontium-90 in Water for 1987

(Millibecquerels per litre)

Station	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Annual Average
Winnipeg River					
1) Pinawa	15	2	65	*	21
2) Lac du Bonnet	*	*	*	1	*
3) Great Falls	21	*	21	*	11
Lake Huron					
1) Port Elgin	*	*	7	5	3
2) Kincardine	8	23	7	1	10
Lake Ontario					
1) Toronto	4	*	7	8	5
2) Ajax	1	8	*	11	5
3) Oshawa	*	*	3	*	*
Ottawa River					
1) Rolphton	11	11	*	6	7
2) Deep River	8	*	9	*	5
3) Petawawa	*	4	12	4	5
4) Pembroke	8	*	*	10	5
5) Ottawa	*	*	*	*	*
St. Lawrence River					
1) Becancour	2	*	2	*	1
2) Grondines	*	*	7	*	2
3) St. Romuald	4	*	1	1	2

* Less than 1 Millibecquerel per litre

Table 7. Cesium-137 in Water for 1987

(Millibecquerels per litre)

Station	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Annual Average
Winnipeg River					
1) Pinawa	1	*	*	*	*
2) Lac du Bonnet	*	*	*	*	*
3) Great Falls	1	2	4	2	2
Lake Huron					
1) Port Elgin	*	*	*	*	*
2) Kincardine	*	*	*	*	*
Lake Ontario					
1) Toronto	*	*	*	*	*
2) Ajax	*	*	*	*	*
3) Oshawa	*	*	*	*	*
Ottawa River					
1) Rolphton	*	3	1	*	1
2) Deep River	*	3	2	*	1
3) Petawawa	1	3	2	3	2
4) Pembroke	2	*	3	2	2
5) Ottawa	2	2	3	*	2
St. Lawrence River					
1) Becancour	*	*	1	*	*
2) Grondines	*	*	*	*	*
3) St. Romuald	*	*	*	1	*

* Less than 1 Millibecquerel per litre

Table 8. Uranium Levels in Drinking Water for 1987

(Micrograms per litre)

Location	First Quarter			Second Quarter			Third Quarter			Fourth Quarter		
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Ontario												
Elliot Lake Treated	←---	0.6	---→	0.4	0.5	0.5	←---	0.8	---→	←---	0.8	---→
Port Hope	←---	0.6	---→	←---	0.5	---→	←---	0.4	---→	←---	0.8	---→
Saskatchewan												
Regina	3.9	4.9	4.7	3.4	3.7	3.1	3.1	1.6	2.4	0.7	0.4	0.6

Table 9. Radium-226 Levels in Drinking Water for 1987

(Millibecquerels per litre)

Location	First Quarter			Second Quarter			Third Quarter			Fourth Quarter		
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
Ontario												
Elliot Lake Treated	←---	14.5	---→	17.4	19.4	15.9	←---	16.6	---→	←---	12.1	---→
Port Hope	←---	6.0	---→	←---	*	---→	←---	5.3	---→	←---	*	---→
Saskatchewan												
Regina	7.7	*	9.5	6.8	*	6.5	7.0	6.9	6.5	5.0	*	*

* Less than 5 Millibecquerels per litre

Table 10. Cesium-137 in the Canadian Milk Monitoring Network for 1987

(Millibecquerels per litre)

Station	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Pre-Chernobyl Level	Annual Average
Calgary	106	118	42	69	44	69	30	63	36	*	*	57	40	58
Edmonton	136	85	63	131	87	58	111	76	74	101	73	52	100	87
Halifax	198	247	269	309	278	131	107	123	75	99	86	77	50	167
Moncton	168	159	194	199	145	108	*	128	*	*	33	*	50	105
Montreal	196	207	182	232	216	122	*	105	*	*	*	36	50	118
Ottawa	100	163	190	18	149	122	37	90	*	*	51	*	60	98
Quebec	267	307	265	326	347	256	83	*	75	47	42	41	30	174
Regina	93	85	66	78	92	*	*	54	71	66	30	31	30	61
Saskatoon	57	86	43	99	102	96	57	78	30	41	62	39	30	66
S.S. Marie	223	223	185	258	288	178	160	*	186	83	149	115	130	173
St. John's	233	142	204	264	123	120	113	248	159	42	80	59	100	149
Sussex	230	223	212	252	283	152	108	97	140	126	97	—	30	175
Thunder Bay	141	124	133	123	166	68	109	61	*	—	37	59	70	88
Toronto	103	93	94	168	79	*	90	*	36	*	43	*	*	69
Truro	217	170	305	226	226	140	123	95	82	*	*	43	40	141
Vancouver	950	745	841	553	421	141	231	241	456	91	152	209	50	419
Windsor	106	87	127	67	108	70	54	*	33	*	*	77	30	68
Winnipeg	118	85	101	174	120	50	64	89	79	131	84	*	60	94
Bruce	183	217	218	95	53	69	*	*	37	*	*	47	40	87
Whiteshell	100	101	116	—	73	*	60	53	*	115	56	*	50	69
Average+	235	213	214	227	178	92	82	87	90	48	57	58	46	132

\+ Population-Weighted

* Less than 30 Millibecquerels per litre

\- No sample

Table 11 - Strontium-90 in the Canadian Milk Monitoring Network for 1987

(Millibecquerels per litre)

Station	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Annual Average
Calgary	51	59	49	48	52
Edmonton	70	69	60	76	69
Halifax	117	72	88	100	94
Moncton	75	93	133	89	98
Montreal	65	52	72	54	61
Ottawa	63	86	74	67	73
Quebec	94	72	78	76	80
Regina	70	53	58	67	62
Saskatoon	75	83	79	63	75
S.S. Marie	113	125	117	98	113
St. John's	89	92	116	92	97
Sussex	93	85	113	117	102
Thunder Bay	79	80	76	75	78
Toronto	41	44	55	42	46
Truro	71	80	116	95	91
Vancouver	54	50	70	58	58
Windsor	61	47	53	57	55
Winnipeg	51	44	64	49	52
National Average+	59	55	66	56	59

+ Population - Weighted

Table 12. Performance in Interlaboratory Comparisons

Medium	Analysis	ERHD Value*	Known Value**
Air Filter	Gross α	0.41	0.37 ± 0.37
	Gross β	1.10	1.11 ± 0.55
	Cs-137	0.41	0.37 ± 0.37
Air Filter	Gross α	0.72	0.52 ± 0.37
	Gross β	1.64	1.59 ± 0.37
Water	Gross α	0.38	0.41 ± 0.37
	Gross β	0.31	0.37 ± 0.37
Water	Gross α	0.15	0.11 ± 0.37
	Gross β	0.41	0.48 ± 0.37
Water	Gross α	0.33	0.41 ± 0.37
	Gross β	0.22	0.26 ± 0.37
Water	Gross α	0.19	0.19 ± 0.37
	Gross β	0.17	0.19 ± 0.37
Water	Gross α	0.15	0.15 ± 0.37
	Gross β	0.33	0.44 ± 0.37
Water	Gross α	0.32	0.26 ± 0.37
	Gross β	0.68	0.70 ± 0.37
Water	Tritium	156	156 ± 31
Water	Tritium	100	107 ± 26
Water	Tritium	160	166 ± 33
Water	Sr-89	0.88	0.93 ± 0.37
	Sr-90	0.88	0.93 ± 0.37
Water	Sr-89	1.41	1.52 ± 0.37
	Sr-90	0.82	0.74 ± 0.37
Water	Ra-226	0.29	0.27 ± 0.08
	Ra-228	0.37	0.28 ± 0.08
Water	Ra-226	0.26	0.27 ± 0.08
	Ra-228	0.61	0.56 ± 0.17
Water	Ra-226	0.33	0.36 ± 0.11
	Ra-228	0.28	0.23 ± 0.07

Table 12. Performance in Interlaboratory Comparisons (continued)

Medium	Analysis	ERHD Value*	Known Value**
Water	Uranium	0.27	0.30 ± 0.44
Water	Uranium	0.51	0.48 ± 0.44
Water	Cr-51	1.40	1.52 ± 0.37
	Co-60	2.69	2.37 ± 0.37
	Zn-65	0.42	0.37 ± 0.37
	Ru-106	2.62	2.78 ± 0.37
	Cs-134	1.44	1.48 ± 0.37
	Cs-137	3.28	2.96 ± 0.37
Water	Cr-51	2.36	2.59 ± 0.37
	Co-60	0.53	0.56 ± 0.37
	Zn-65	1.72	1.70 ± 0.37
	Ru-106	1.98	2.26 ± 0.37
	Cs-134	0.79	0.93 ± 0.37
	Cs-137	1.93	1.89 ± 0.37
Water	I-131	1.73	1.78 ± 0.44
Water	I-131	1.04	0.96 ± 0.44
Milk	Sr-89	0.36	0.33 ± 0.37
	Sr-90	0.04	0.00 ± 0.11
	I-131	1.63	1.81 ± 0.44
	Cs-137	1.51	1.44 ± 0.37
	K	1453	1565 ± 156
Milk	Sr-89	2.73	2.56 ± 0.37
	Sr-90	1.16	1.30 ± 0.11
	I-131	2.05	2.19 ± 0.44
	Cs-137	2.64	2.74 ± 0.37
	K	1463	1525 ± 152
Air Sample	Rn-22	2220 ± 185	2480 ± 50
Air Sample	Rn-222	450 ± 30	450 ± 30

* All units are BqL^{-1} except air filters (Bq per filter), Rn-222 (Bqm^{-3}) and potassium ($mg\ L^{-1}$)

** Warning level at two standard deviations

Table 13.
Radionuclide Analyses of Imported Foodstuffs for 1987
(Becquerels per Kilogram)

Sample Name	Country	Sample Date	I-131	Ru-103	Ru-106	Cs-137	Cs-134	K-40
LIME FLOWER	ALBANIA	87/02/19	*	*	*	320	130	620
COUCH-GRASS ROOT	ALBANIA	87/02/19	*	*	*	*	*	290
DANDELION ROOT	ALBANIA	87/02/19	*	*	*	*	*	450
ROSEMARY	ALBANIA	87/02/19	*	*	*	*	*	930
BEER	AUSTL.	87/05/26	*	*	*	*	*	6.5
WHITE WINE	AUSTL.	87/07/09	*	*	*	*	*	28
GRAPE CONCENTRATE	AUSTRIA	87/01/01	*	*	*	*	*	140
APPLE CONCENTRATE	AUSTRIA	87/01/16	*	*	*	*	*	260
APPLE CONCENTRATE	AUSTRIA	87/01/16	*	*	*	*	*	260
APPLE CONCENTRATE	AUSTRIA	87/01/20	*	*	*	91	40	190
APPLE CONCENTRATE	AUSTRIA	87/02/09	*	*	*	*	*	290
RASPBERRY ESTER	AUSTRIA	87/02/09	*	*	*	*	*	*
BEER	AUSTRIA	87/07/09	*	*	*	*	*	14
WHITE WINE	AUSTRIA	87/07/09	*	*	*	0.97	0.55	23
BEEF EXTRACT	BRAZIL	87/06/09	*	*	*	8.3	*	1700
BEEF EXTRACT	BRAZIL	87/06/10	*	*	*	15	*	1700
BEEF EXTRACT	BRAZIL	87/06/11	*	*	*	30	8.5	2600
BEEF EXTRACT	BRAZIL	87/06/11	*	*	*	130	51	2100
BEEF EXTRACT	BRAZIL	87/06/11	*	*	*	250	90	1900
BEEF EXTRACT	BRAZIL	87/08/05	*	*	*	13	*	2300
BEEF EXTRACT	BRAZIL	87/09/21	*	*	*	14	*	2500
FETA CHEESE	BULGARIA	87/01/28	*	*	*	*	*	24
FETA CHEESE	BULGARIA	87/10/30	*	*	*	35	11	23
WILLOW LEAVES	BULGARIA	87/02/19	*	*	*	*	*	430
SAPONARIA HERB	BULGARIA	87/02/19	*	*	77	230	99	720
BEER	CHINA	87/05/26	*	*	*	*	*	33
BEER	CZECH.	87/04/24	*	*	*	*	*	85
MILK POWDER	DENMARK	87/01/21	*	*	*	11	3.9	400
CONFECTIONERY MIX	DENMARK	87/05/08	*	*	*	2.6	0.70	340
BEER	DENMARK	87/05/26	*	*	*	*	*	96

* Less than limit of detection

Table 13. (cont'd)
Radionuclide Analyses of Imported Foodstuffs for 1987
(Becquerels per Kilogram)

Sample Name	Country	Sample Date	I-131	Ru-103	Ru-106	Cs-137	Cs-134	K-40
BASIL	EGYPT	87/01/13	*	*	*	*	*	1100
FENNEL SEED	EGYPT	87/01/16	*	*	*	2.3	*	1200
BASIL	EGYPT	87/01/16	*	*	*	*	*	1000
BASIL	EGYPT	87/02/05	*	*	*	4.6	*	1200
ANISE SEED	EGYPT	87/02/05	*	*	*	*	*	630
BASIL	EGYPT	87/02/13	*	*	*	*	*	2000
CARAWAY SEEDS	EGYPT	87/03/10	*	*	79	140	50	790
PEPPERMINT	EGYPT	87/03/10	*	*	*	1.1	*	820
BASIL	EGYPT	87/05/11	*	*	*	4.7	*	1200
BASIL	EGYPT	87/11/10	*	*	*	*	*	1300
MILK POWDER	EUROPE	87/06/17	*	*	*	68	26	330
JAM	FINLAND	87/11/25	*	*	*	13	*	23
VODKA	FINLAND	87/05/26	*	*	*	*	*	*
CHOCOLATE SPREAD	FRANCE	87/04/24	*	*	*	46	15	180
DRIED MUSHROOMS	FRANCE	87/06/22	*	*	*	15	*	980
DRIED MUSHROOMS	FRANCE	87/09/16	*	*	*	39	9.2	840
DRIED MUSHROOMS	FRANCE	87/09/16	*	*	62	740	240	1600
CANNED MUSHROOMS	FRANCE	87/09/16	*	*	*	*	*	28
SAVORY LEAVES	FRANCE	87/01/07	*	*	*	2.3	*	400
ROSEMARY LEAVES	FRANCE	87/01/07	*	*	*	*	*	580
MARJORAM	FRANCE	87/01/07	*	*	*	*	*	780
ANISE SEED	FRANCE	87/01/07	*	*	*	6.7	2.6	590
DILL WEED	FRANCE	87/01/07	*	*	*	*	*	660
TARRAGON	FRANCE	87/01/07	*	*	*	17	6.9	1300
WHOLE CHEVRIL	FRANCE	87/01/12	*	*	*	*	*	1800
BASIL	FRANCE	87/01/20	*	*	*	2.6	0.58	1100
CHEVRIL	FRANCE	87/01/13	*	*	*	*	*	1300
TARRAGON	FRANCE	87/01/13	*	*	*	*	*	1400
BOXWOOD LEAVES	FRANCE	87/01/16	*	*	*	21	7.8	190
COUCH-GRASS ROOT	FRANCE	87/01/16	*	*	*	*	*	270
BLUEBERRY TIP	FRANCE	87/01/16	*	*	*	38	*	240
THYME	FRANCE	87/02/17	*	*	*	7.7	*	400
CUT ASH	FRANCE	87/02/19	*	*	*	1.3	*	530
BOXWOOD LEAVES	FRANCE	87/02/19	*	*	*	110	42	310
STELLARIA HERB	FRANCE	87/02/19	*	*	*	3.2	*	1800
PYRAMIDAL ELM	FRANCE	87/02/19	*	*	*	12	*	150
WOODY NIGHTSHADE	FRANCE	87/02/19	*	*	*	*	*	430
CHABLIS WINE	FRANCE	87/04/24	*	*	*	*	*	83
BEAUJOLAIS WINE	FRANCE	87/04/24	*	*	*	*	*	54
BEAUJOLAIS WINE	FRANCE	87/04/24	*	*	*	*	*	46

* Less than limit of detection

Table 13. (cont'd)
Radionuclide Analyses of Imported Foodstuffs for 1987
(Becquerels per Kilogram)

Sample Name	Country	Sample Date	I-131	Ru-103	Ru-106	Cs-137	Cs-134	K-40
MACON SUPERIEUR WINE	FRANCE	87/04/24	*	*	*	*	*	120
BEER	FRANCE	87/05/26	*	*	*	*	*	47
FETA CHEESE	GREECE	87/01/28	*	*	*	*	*	4.8
FETA CHEESE	GREECE	87/11/06	*	*	*	1.4	*	12
MACARONI PRODUCT	GREECE	87/07/02	*	*	*	230	75	110
MACARONI PRODUCT	GREECE	87/07/02	*	*	*	91	28	100
SOUP BASE	GREECE	87/07/22	*	*	*	130	43	110
FIDELINI NOODLES	GREECE	87/07/22	*	*	*	520	170	48
PASTA	GREECE	87/07/28	*	*	*	430	150	65
PASTA	GREECE	87/07/28	*	*	*	530	180	81
SPAGHETTI	GREECE	87/07/28	*	*	*	520	180	78
SPAGHETTI	GREECE	87/07/28	*	*	*	630	210	95
SPAGHETTI	GREECE	87/08/07	*	*	*	330	110	78
PASTA	GREECE	87/08/07	*	*	*	400	130	77
MACARONI	GREECE	87/08/07	*	*	*	310	100	61
MACARONI	GREECE	87/08/07	*	*	*	320	100	61
PASTA	GREECE	87/08/07	*	*	*	440	140	110
PASTA	GREECE	87/08/07	*	*	*	330	110	77
PASTA	GREECE	87/08/07	*	*	*	240	77	67
SNAILS	GREECE	87/08/19	*	*	*	11	3.5	3.3
OREGANO	GREECE	87/01/14	*	32	390	1200	520	450
OREGANO	GREECE	87/01/28	*	*	*	14	5.5	600
SESAME SEED PULP	GREECE	87/03/20	*	*	*	*	*	74
SAGE	GREECE	87/04/15	*	*	*	7.0	3.1	440
OREGANO	GREECE	87/10/01	*	*	400	1700	570	450
MIXED SPICES	HOLLAND	87/01/06	*	*	*	0.69	*	310
CELERY ROOT FLAKES	HOLLAND	87/01/07	*	*	*	*	*	990
PARSLEY LEAVES	HOLLAND	87/01/07	*	*	*	5.7	3.9	1300
CELERY ROOT POWDER	HOLLAND	87/01/07	*	*	*	*	*	1200
POPPY SEED	HOLLAND	87/01/12	*	*	*	*	*	250
CARAWAY SEED	HOLLAND	87/02/02	*	*	*	*	*	370
POPPY SEED	HOLLAND	87/02/02	*	*	*	*	*	410
BEER	HOLLAND	87/05/26	*	*	*	*	*	75
BEER	HOLLAND	87/05/26	*	*	*	*	*	49
APPLE CONCENTRATE	HUNGARY	87/01/01	*	*	*	39	16	200
CABBAGE(STUFFED)	HUNGARY	87/08/18	*	*	*	7.1	1.6	52
CABBAGE(STUFFED)	HUNGARY	87/08/18	*	*	*	3.9	1.0	54
GOULASH	HUNGARY	87/08/18	*	*	*	12	3.6	74
BEEF BRISKET	HUNGARY	87/08/18	*	*	*	2.5	0.56	75
DRIED LEEK FLAKES	HUNGARY	87/01/07	*	*	*	*	*	710

* Less than limit of detection

Table 13. (cont'd)
Radionuclide Analyses of Imported Foodstuffs for 1987
(Becquerels per Kilogram)

Sample Name	Country	Sample Date	I-131	Ru-103	Ru-106	Cs-137	Cs-134	K-40
PAPRIKA	HUNGARY	87/01/16	*	*	*	*	*	920
PAPRIKA	HUNGARY	87/01/27	*	*	*	*	*	870
PAPRIKA	HUNGARY	87/02/06	*	*	*	0.55	*	950
PERIWINKLE	HUNGARY	87/02/19	*	*	*	8.8	*	560
DATES	IRAN	87/01/28	*	*	*	*	*	260
DATES	IRAQ	87/01/23	*	*	*	*	*	250
DATES	IRAQ	87/01/28	*	*	*	*	*	260
FORMULA POWDER	IRELAND	87/02/12	*	*	*	63	26	210
FORMULA POWDER	IRELAND	87/02/12	*	*	*	62	26	200
ROMANO CHEESE	ITALY	87/02/13	*	*	*	34	12	30
TRUFFLES	ITALY	87/03/31	*	*	*	*	*	1800
DRIED MUSHROOMS	ITALY	87/04/06	*	*	*	130	49	1100
DRIED MUSHROOMS	ITALY	87/05/01	*	*	*	61	16	890
FRESH FIGS	ITALY	87/07/08	*	*	*	1.8	0.50	55
JUNIPER BERRY	ITALY	87/02/19	*	*	*	48	19	270
WHITE WINE	ITALY	87/05/26	*	*	*	*	*	52
WHITE WINE	ITALY	87/05/26	*	*	*	1.3	0.45	19
WHITE WINE	ITALY	87/07/09	*	*	*	0.82	*	12
RED WINE	ITALY	87/07/09	*	*	*	*	*	34
RED WINE	ITALY	87/07/09	*	*	*	0.90	*	37
WHITE WINE	ITALY	87/07/09	*	*	*	*	*	8.9
WHITE WINE	ITALY	87/07/09	*	*	*	1.1	0.48	20
BEER	JAPAN	87/05/26	*	*	*	*	*	120
MALLOW LEAVES	MOROCCO	87/01/16	*	*	*	*	*	1100
RED VINE	MOROCCO	87/02/19	*	*	*	4.2	*	160
BORAGE	MOROCCO	87/02/19	*	*	*	3.6	*	2000
CORIANDER	MOROCCO	87/04/22	*	*	*	*	*	530
CORIANDER	MOROCCO	87/06/29	*	*	*	*	*	490
STRAWBERRY PULP	POLAND	87/02/12	*	*	*	3.2	1.4	57
BEEF EXTRACT	POLAND	87/06/09	*	*	*	330	120	2000
COFFEE SUBSTITUTE	POLAND	87/01/28	*	*	*	19	8.9	280
COFFEE SUBSTITUTE	POLAND	87/04/06	*	*	*	11	4.4	420

* Less than limit of detection

Table 13. (cont'd)
Radionuclide Analyses of Imported Foodstuffs for 1987
(Becquerels per Kilogram)

Sample Name	Country	Sample Date	I-131	Ru-103	Ru-106	Cs-137	Cs-134	K-40
BEER	POLAND	87/05/26	*	*	*	*	*	15
VODKA	POLAND	87/07/09	*	*	*	*	*	*
CHICK PEAS	SPAIN	87/01/19	*	*	*	*	*	370
FIGS	SPAIN	87/01/19	*	*	*	*	*	160
FENUGREEK	SPAIN	87/01/07	*	*	*	*	*	420
THYME	SPAIN	87/01/20	*	*	*	9.6	*	400
THYME	SPAIN	87/01/22	*	*	*	11	3.6	380
ROSEMARY	SPAIN	87/01/13	*	*	*	*	*	1100
BAY LEAVES	SPAIN	87/01/28	*	*	*	5.3	*	220
THYME	SPAIN	87/01/28	*	*	*	5.8	1.1	330
UVA URSI LEAVES	SPAIN	87/02/19	*	*	*	2.9	*	160
WHITE WINE	SPAIN	87/04/24	*	*	*	*	*	170
VODKA	SWEDEN	87/05/26	*	*	*	*	*	*
DRIED MUSHROOMS	SWITZ.	87/04/21	*	*	*	47	*	1400
DRIED MUSHROOMS	SWITZ.	87/04/21	*	*	*	45	6.1	650
FILBERTS	TURKEY	87/01/05	*	*	*	68	27	180
APPLE CONCENTRATE	TURKEY	87/01/01	*	*	*	50	20	200
FILBERTS	TURKEY	87/01/19	*	*	*	56	24	180
FILBERTS	TURKEY	87/01/13	*	*	*	83	36	190
DRIED APRICOT	TURKEY	87/01/13	*	*	*	47	20	570
FILBERTS	TURKEY	87/01/19	*	*	*	76	30	210
DRIED FIGS	TURKEY	87/01/16	*	*	*	36	15	260
APRICOTS	TURKEY	87/01/23	*	*	*	44	17	510
FIG PASTE	TURKEY	87/01/23	*	*	*	49	19	310
RAISINS	TURKEY	87/01/23	*	*	*	*	*	370
DRIED FIGS	TURKEY	87/01/30	*	*	*	54	24	290
FILBERTS	TURKEY	87/02/02	*	*	*	56	24	170
FILBERTS	TURKEY	87/02/02	*	*	*	52	22	170
FILBERTS	TURKEY	87/02/03	*	*	*	55	22	180
TOMATO PASTE	TURKEY	87/03/04	*	*	*	*	*	530
FILBERTS	TURKEY	87/03/06	*	*	*	410	160	200
CHICK PEAS	TURKEY	87/03/13	*	*	*	0.70	*	330
FILBERTS	TURKEY	87/03/25	*	*	*	580	230	180
FILBERTS	TURKEY	87/03/30	*	*	*	150	53	180
FILBERTS	TURKEY	87/04/01	*	*	*	94	35	190
TOMATO PASTE	TURKEY	87/04/06	*	*	*	*	*	460
FILBERTS	TURKEY	87/04/06	*	*	*	120	45	200
RAISINS	TURKEY	87/04/08	*	*	*	8.4	3.5	330

* Less than limit of detection

Table 13. (cont'd)
Radionuclide Analyses of Imported Foodstuffs for 1987
(Becquerels per Kilogram)

Sample Name	Country	Sample Date	I-131	Ru-103	Ru-106	Cs-137	Cs-134	K-40
TOMATO PASTE	TURKEY	87/04/10	*	*	*	*	*	440
TOMATO PASTE	TURKEY	87/04/10	*	*	*	*	*	460
RAISINS	TURKEY	87/04/22	*	*	*	7.7	2.7	340
FILBERTS	TURKEY	87/04/29	*	*	*	190	73	190
FILBERTS	TURKEY	87/04/29	*	*	*	85	32	220
FILBERTS	TURKEY	87/04/29	*	*	*	60	21	170
DRIED APRICOTS	TURKEY	87/04/30	*	*	*	32	12	390
FILBERTS	TURKEY	87/05/08	*	*	*	160	62	200
PISTACHIOS	TURKEY	87/05/14	*	*	*	*	*	150
PISTACHIOS	TURKEY	87/05/14	*	*	*	*	*	150
FILBERTS	TURKEY	87/05/19	*	*	*	110	39	160
CHICK PEAS	TURKEY	87/05/15	*	*	*	0.95	*	390
DRIED APRICOTS	TURKEY	87/05/20	*	*	*	29	8.8	350
FILBERTS	TURKEY	87/06/04	*	*	*	110	42	190
FILBERTS	TURKEY	87/06/02	*	*	*	*	*	220
APRICOTS	TURKEY	87/06/02	*	*	*	29	10	320
RAISINS	TURKEY	87/06/02	*	*	*	4.2	1.5	370
APRICOTS	TURKEY	87/06/02	*	*	*	28	8.9	480
RAISINS	TURKEY	87/06/04	*	*	*	5.8	1.8	370
FILBERTS (SHELLED)	TURKEY	87/06/18	*	*	*	0.77	*	210
FILBERTS (SHELLED)	TURKEY	87/06/18	*	*	*	2.2	*	180
FILBERTS (SHELLED)	TURKEY	87/06/18	*	*	*	0.33	*	200
FILBERTS	TURKEY	87/06/23	*	*	*	110	40	180
TOMATO PASTE	TURKEY	87/06/22	*	*	*	*	*	470
CHICKPEAS	TURKEY	87/06/25	*	*	*	*	*	290
FILBERTS	TURKEY	87/06/25	*	*	*	150	50	190
SPLIT LENTILS	TURKEY	87/06/25	*	*	*	46	18	260
FILBERTS	TURKEY	87/06/24	*	*	*	260	93	220
FILBERTS	TURKEY	87/06/24	*	*	*	210	80	260
PASTA	TURKEY	87/07/21	*	*	*	36	12	51
FILBERTS	TURKEY	87/08/06	*	*	*	86	29	160
RAISINS	TURKEY	87/08/17	*	*	*	4.5	1.5	340
RAISINS	TURKEY	87/08/26	*	*	*	*	*	310
DRIED APRICOTS	TURKEY	87/08/24	*	*	*	26	8.5	350
FILBERTS(SHELLED)	TURKEY	87/08/21	*	*	*	0.77	*	210
FILBERTS(SHELLED)	TURKEY	87/08/21	*	*	*	0.39	*	210
RAISINS	TURKEY	87/09/08	*	*	*	3.9	1.2	290
RAISINS	TURKEY	87/09/30	*	*	*	3.7	1.2	340
RAISINS	TURKEY	87/11/04	*	*	*	4.6	2.5	330
RAISINS	TURKEY	87/11/04	*	*	*	7.9	2.1	340
RAISINS	TURKEY	87/11/04	*	*	*	*	*	320
RAISINS	TURKEY	87/11/04	*	*	*	6.1	1.3	320
RAISINS	TURKEY	87/11/04	*	*	*	4.9	1.9	380
FIGS	TURKEY	87/11/05	*	*	*	7.2	1.6	180
FIGS	TURKEY	87/11/05	*	*	*	3.8	0.9	120
FIGS	TURKEY	87/11/05	*	*	*	3.0	0.8	110

* Less than limit of detection

Table 13. (cont'd)
Radionuclide Analyses of Imported Foodstuffs for 1987
(Becquerels per Kilogram)

Sample Name	Country	Sample Date	I-131	Ru-103	Ru-106	Cs-137	Cs-134	K-40
FIGS	TURKEY	87/10/30	*	*	*	5.0	1.5	320
RAISINS	TURKEY	87/11/10	*	*	*	5.0	1.2	240
FILBERTS	TURKEY	87/11/27	*	*	*	27	8.0	190
FILBERTS	TURKEY	87/12/04	*	*	*	5.7	1.5	210
FILBERTS	TURKEY	87/12/08	*	*	*	66	19	190
FILBERTS	TURKEY	87/12/11	*	*	*	130	39	180
OREGANO	TURKEY	87/01/12	*	22	310	1100	460	440
BAY LEAVES	TURKEY	87/01/28	*	*	*	*	*	160
SAGE	TURKEY	87/02/08	*	34	980	2400	990	670
BAY LEAVES	TURKEY	87/02/13	*	*	*	280	110	210
OREGANO	TURKEY	87/02/25	*	21	600	1700	690	510
OREGANO	TURKEY	87/02/27	*	*	*	2.8	*	480
BAY LEAVES	TURKEY	87/03/06	*	*	*	91	38	160
OREGANO	TURKEY	87/03/06	*	*	*	5.3	*	460
BAY LEAVES	TURKEY	87/03/09	*	*	110	290	100	160
FENNEL	TURKEY	87/03/10	*	*	*	*	*	540
BAY LEAVES	TURKEY	87/03/10	*	*	190	900	370	200
BAY LEAVES	TURKEY	87/03/10	*	*	52	250	98	160
OREGANO	TURKEY	87/03/13	*	18	440	1700	670	400
BAY LEAVES	TURKEY	87/03/13	*	*	250	1200	430	240
BAY LEAVES	TURKEY	87/03/16	*	1.2	67	190	75	150
OREGANO	TURKEY	87/03/16	*	5.3	300	1100	410	400
BAY LEAVES	TURKEY	87/03/18	*	*	61	170	68	160
BAY LEAVES	TURKEY	87/03/25	*	*	52	220	79	130
OREGANO	TURKEY	87/04/09	*	*	*	*	*	500
OREGANO	TURKEY	87/04/15	*	*	560	2400	930	450
ANISE	TURKEY	87/04/22	*	*	*	4.5	*	560
BAY LEAVES	TURKEY	87/04/22	*	*	56	170	62	200
FENNEL SEED	TURKEY	87/04/22	*	*	*	0.60	*	640
OREGANO	TURKEY	87/04/22	*	*	*	10	2.0	480
BAY LEAVES	TURKEY	87/04/22	*	*	210	1200	460	230
OREGANO	TURKEY	87/04/24	*	*	320	950	360	470
BAY LEAVES	TURKEY	87/04/28	*	*	46	110	42	140
ANISE	TURKEY	87/04/24	*	*	*	12	3.9	590
OREGANO	TURKEY	87/04/24	*	*	420	1600	590	530
BAY LEAVES	TURKEY	87/05/07	*	*	140	820	310	180
RAISINS	TURKEY	87/05/13	*	*	*	7.2	2.9	310
OREGANO	TURKEY	87/05/19	*	*	510	1800	680	460
OREGANO	TURKEY	87/05/20	*	*	240	820	310	480
OREGANO	TURKEY	87/05/26	*	*	270	930	340	460
BAY LEAVES	TURKEY	87/06/02	*	*	*	640	240	180
BAY LEAVES	TURKEY	87/06/02	*	*	90	400	150	190
OREGANO	TURKEY	87/06/02	*	2.5	520	1500	580	500
BAY LEAVES	TURKEY	87/06/02	*	*	170	830	310	180
BAY LEAVES	TURKEY	87/05/28	*	*	48	92	38	160
BAY LEAVES	TURKEY	87/06/22	*	*	160	890	330	240

* Less than limit of detection

Table 13.
Radionuclide Analyses of Imported Foodstuffs for 1987
(Becquerels per Kilogram)

Sample Name	Country	Sample Date	I-131	Ru-103	Ru-106	Cs-137	Cs-134	K-40
OREGANO	TURKEY	87/07/03	*	*	570	1800	670	450
FENNEL SEED	TURKEY	87/06/29	*	*	*	*	*	760
OREGANO	TURKEY	87/07/08	*	*	150	800	300	370
OREGANO	TURKEY	87/07/08	*	*	190	970	340	380
MARJORAM	TURKEY	87/07/15	*	*	560	1000	350	530
SAGE	TURKEY	87/07/15	*	*	250	1200	440	550
BAY LEAVES	TURKEY	87/07/15	*	*	150	640	230	220
BAY LEAVES	TURKEY	87/07/15	*	*	100	760	280	190
OREGANO	TURKEY	87/07/09	*	*	220	1100	370	490
FENUGREEK	TURKEY	87/07/21	*	*	*	*	*	420
BAY LEAVES	TURKEY	87/07/22	*	*	*	120	40	190
SAGE	TURKEY	87/07/20	*	*	280	800	290	480
CHICK PEAS	TURKEY	87/07/20	*	*	*	0.52	*	360
PAPRIKA	TURKEY	87/07/28	*	*	*	*	*	730
OREGANO	TURKEY	87/08/05	*	*	260	1000	350	590
BAY LEAVES	TURKEY	87/08/05	*	*	92	860	310	140
BAY LEAVES	TURKEY	87/08/05	*	*	120	590	210	220
BAY LEAVES	TURKEY	87/08/05	*	*	90	730	270	250
BAY LEAVES	TURKEY	87/07/31	*	*	100	1100	370	180
BAY LEAVES	TURKEY	87/07/31	*	*	190	1600	550	200
SAGE	TURKEY	87/07/31	*	*	170	520	180	480
FENUGREEK	TURKEY	87/07/31	*	*	*	9.7	2.8	410
OREGANO	TURKEY	87/08/13	*	*	530	2100	720	510
SAGE	TURKEY	87/08/18	*	*	220	910	320	370
BAY LEAVES	TURKEY	87/08/18	*	*	190	1500	510	230
SAGE	TURKEY	87/08/28	*	*	190	790	270	550
OREGANO	TURKEY	87/09/01	*	*	450	1800	620	510
OREGANO	TURKEY	87/09/11	*	*	180	690	230	490
OREGANO	TURKEY	87/09/14	*	*	230	1300	420	500
BAY LEAVES	TURKEY	87/09/22	*	*	55	310	110	240
BAY LEAVES	TURKEY	87/09/21	*	*	*	130	45	170
SAGE	TURKEY	87/10/05	*	*	*	850	290	410
OREGANO	TURKEY	87/10/14	*	*	320	1600	540	450
SAGE	TURKEY	87/10/14	*	*	73	200	69	550
PUMPKIN SEEDS	TURKEY	87/10/21	*	*	*	1.2	*	230
BAY LEAVES	TURKEY	87/10/29	*	*	170	1300	430	240
OREGANO	TURKEY	87/10/29	*	*	340	1700	560	550
OREGANO	TURKEY	87/10/29	*	*	*	58	18	750
SAGE	TURKEY	87/11/19	*	*	330	1000	350	510
CUMIN	TURKEY	87/11/19	*	*	*	*	*	630
OREGANO	TURKEY	87/11/25	*	*	250	1500	450	500
OREGANO	TURKEY	87/12/04	*	*	240	1500	450	490
BAY LEAVES	TURKEY	87/12/04	*	*	*	41	14	180
OREGANO	TURKEY	87/12/11	*	*	260	1700	540	470
OREGANO	TURKEY	87/12/18	*	*	330	1400	460	540
OREGANO	TURKEY	87/12/17	*	*	250	1700	530	540

* Less than limit of detection

Table 13. (cont'd)
Radionuclide Analyses of Imported Foodstuffs for 1987
(Becquerels per Kilogram)

Sample Name	Country	Sample Date	I-131	Ru-103	Ru-106	Cs-137	Cs-134	K-40
OREGANO	TURKEY	87/12/17	*	*	270	2300	670	500
OREGANO	TURKEY	87/12/29	*	*	460	2000	630	490
FORMULA POWDER	U.S.A.	87/09/12	*	*	*	*	*	260
RICE	U.S.A.	87/09/12	*	*	*	*	*	38
PEANUT BUTTER	U.S.A.	87/09/12	*	*	*	*	*	220
SEEDS	U.S.A.	87/09/18	*	*	*	*	*	480
SEEDS	U.S.A.	87/09/18	*	*	*	*	*	420
POLYCOSE POWDER	U.S.A.	87/09/18	*	*	*	*	*	*
VODKA	U.S.S.R.	87/05/26	*	*	*	*	*	*
CHOCOLATE SPREAD	UNKNOWN	87/04/24	*	*	*	*	*	260
CHOCOLATE CANDY	W. GERM.	87/04/22	*	*	*	26	9.4	100
CHOCOLATE SPREAD	W. GERM.	87/04/24	*	*	*	*	*	130
APPLE CONCENTRATE	W. GERM.	87/01/28	*	*	*	150	62	200
APPLE CONCENTRATE	W. GERM.	87/02/12	*	*	*	39	16	330
CORIANDER SEED	W. GERM.	87/01/09	*	*	*	*	*	580
PARSLEY	W. GERM.	87/01/09	*	*	*	10	2.9	1500
BLACKCURRENT LEAVES	W. GERM.	87/01/09	*	*	*	1.0	*	360
GOLDEN ROD	W. GERM.	87/01/09	*	*	13	100	41	720
VALERIAN ROOT	W. GERM.	87/01/09	*	*	*	2.0	0.51	500
ORRIS POWDER	W. GERM.	87/01/09	*	*	*	*	*	350
SCULLAP HERB	W. GERM.	87/01/09	*	*	*	1.1	*	550
CARLINE ROOT	W. GERM.	87/01/09	*	*	*	2.8	0.95	830
ANSERINE	W. GERM.	87/01/09	*	*	*	5.3	*	900
RASPBERRY LEAVES	W. GERM.	87/01/30	*	*	*	9.5	*	790
CAMOMILE LEAVES	W. GERM.	87/01/30	*	*	*	*	*	920
LIME LEAVES	W. GERM.	87/01/30	*	*	*	3.1	*	640
LIME FLOWERS	W. GERM.	87/01/30	*	*	*	1.4	*	490
SENNA LEAVES	W. GERM.	87/01/30	*	*	*	*	*	440
HORSETAIL	W. GERM.	87/01/30	*	*	*	*	*	1100
CAMMOCK ROOT	W. GERM.	87/01/30	*	*	*	*	*	160
VERVAIN LEAVES	W. GERM.	87/01/30	*	*	*	7.6	2.0	780
LICORICE ROOT	W. GERM.	87/01/30	*	*	*	0.80	*	250
ORANGE LEAVES	W. GERM.	87/01/30	*	*	*	*	*	170
ARTICHOKE LEAVES	W. GERM.	87/01/30	*	*	*	0.99	*	860
BEER	W. GERM.	87/04/24	*	*	*	*	*	98
RHEINPFALZ WINE	W. GERM.	87/04/24	*	*	*	*	*	110
LIEBFRAUMILCH	W. GERM.	87/04/24	*	*	*	*	*	73
WHITE WINE	W. GERM.	87/05/26	*	*	*	*	*	61

* Less than limit of detection

Table 13. (cont'd)
Radionuclide Analyses of Imported Foodstuffs for 1987
(Becquerels per Kilogram)

Sample Name	Country	Sample Date	I-131	Ru-103	Ru-106	Cs-137	Cs-134	K-40
BEER	W. GERM.	87/05/26	*	*	*	*	*	67
BEER	W. GERM.	87/07/09	*	*	*	*	*	8.9
WHITE WINE	W. GERM.	87/07/09	*	*	*	*	*	25
WHITE WINE	W. GERM.	87/07/09	*	*	*	*	*	22
APPLE CONCENTRATE	YUGO.	87/01/20	*	*	*	150	64	190
PLUM BUTTER	YUGO.	87/04/30	*	*	*	1.0	*	36
DRIED MUSHROOMS	YUGO.	87/05/01	*	*	84	470	170	1300
CANNED HAM	YUGO.	87/06/15	*	*	*	17	6.5	100
CANNED HAM	YUGO.	87/07/08	*	*	*	8.7	2.8	93
CANNED HAM	YUGO.	87/08/07	*	*	*	36	12	76
SAGE	YUGO.	87/01/20	*	*	*	120	54	350
SAGE	YUGO.	87/01/20	*	4.8	100	320	140	680
SAGE	YUGO.	87/01/14	*	2.6	19	95	41	340
SAVORY	YUGO.	87/01/13	*	*	*	2.9	*	400
GROUND IVY	YUGO.	87/01/16	*	*	*	8.0	*	1100
MILLEFLEURS	YUGO.	87/01/16	*	*	*	*	*	790
NETTLE	YUGO.	87/01/16	*	*	*	*	*	1500
DANDELION ROOT	YUGO.	87/01/16	*	*	*	*	*	570
BIRCH LEAVES	YUGO.	87/01/16	*	*	*	1.5	*	320
CALAMUS ROOT	YUGO.	87/01/16	*	*	*	1.6	*	590
MARSHMALLOW LEAVES	YUGO.	87/01/16	*	*	*	*	*	670
BLACKBERRY LEAVES	YUGO.	87/01/16	*	*	*	3.0	*	310
SAGE	YUGO.	87/02/20	*	*	*	33	14	370
STINGING NETTLE	YUGO.	87/02/19	*	*	*	*	*	1200
GREAT MULLEIN	YUGO.	87/02/19	*	*	*	2.6	*	570
LIME LEAVES	YUGO.	87/02/19	*	*	*	*	*	510
SAGE	YUGO.	87/03/02	*	*	*	75	31	360
SAGE	YUGO.	87/03/09	*	*	66	170	65	510
SAGE	YUGO.	87/04/09	*	*	170	540	190	450
SAGE	YUGO.	87/07/16	*	*	45	190	65	280
SAGE	YUGO.	87/09/15	*	*	83	350	120	380
SAGE	YUGO.	87/10/21	*	*	*	20	*	380
SAGE	YUGO.	87/12/15	*	*	100	480	150	420
WHITE WINE	YUGO.	87/05/26	*	*	*	*	*	56
WHITE WINE	YUGO.	87/07/09	*	*	*	*	*	11

* Below Detection Limit
Detection limit for I-131 = 0.15 Bq/Kg
Detection limit for Ru-103 = 0.15 Bq/Kg
Detection limit for Ru-106 = 0.14 Bq/Kg
Detection limit for Cs-137 = 0.18 Bq/Kg
Detection limit for Cs-134 = 0.13 Bq/Kg

Table 14. Gross Beta Activity in the
Canadian Precipitation Monitoring Network for 1986
(Combined Wet and Dry Deposition)

(Becquerels per square metre)

Station	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Total Annual Deposition	Annual Rainfall mm Water
Calgary	21	84	36	10	151	478
Churchill	35	83	38	18	173	449
Coral Harbour	39	62	27	17	145	306
Digby	75	143	56	23	297	976
Edmonton	42	196	51	27	316	564
Fredericton	42	128	38	28	235	985
Goose Bay	103	107	38	35	283	836
Greenwood	51	102	53	48	254	1041
Halifax	27	85	35	37	183	1355
Hay River	48	212	40	26	326	338
Inuvik	40	100	20	41	200	197
Montreal	48	209	54	36	346	908
Moosonee	50	69	67	45	231	804
Ottawa - Airport	23	104	48	46	221	985
Ottawa - BRMD**	30	218	37	31	316	985
Quebec	36	254	73	30	394	1167
Regina	49	137	42	24	252	270
Resolute	20	54	22	12	107	153
Saskatoon	23	110	40	35	208	330
Sault Ste. Marie	20	126	50	47	243	892
St. John's	42	201	33	68	344	1325
Thunder Bay	21	86	48	66	220	593
Toronto	51	90	87	57	285	980
Vancouver	35	237	15	52	339	1118
Whitehorse	34	119	26	11	190	275
Windsor	29	157	46	37	269	862
Winnipeg	19	145	51	34	249	447
Yellowknife	19	131	26	31	206	251
National Average +	36	111	33	26	203	

\+ Geographical-Area Weighted

** BRMD = Bureau of Radiation and Medical Devices